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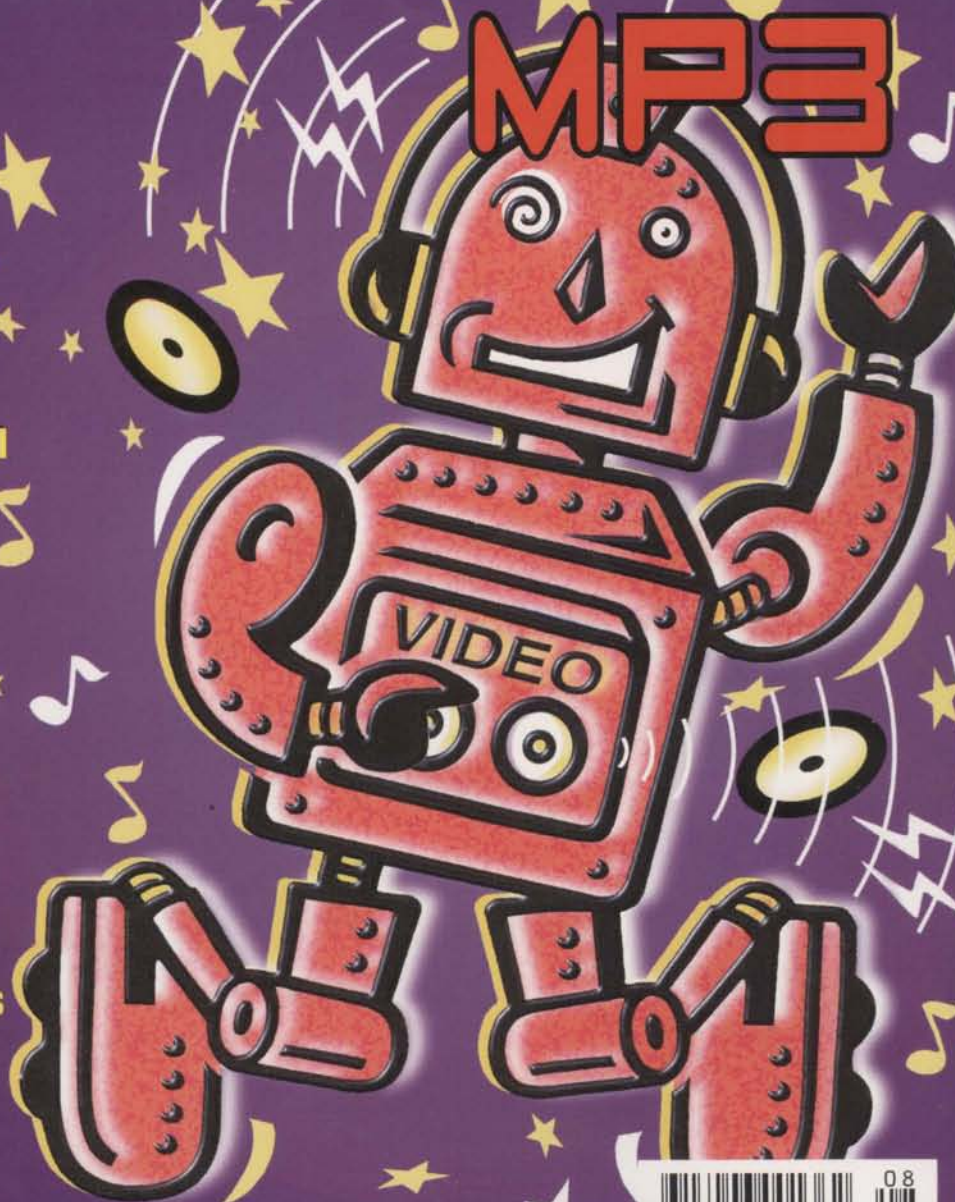
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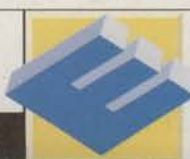
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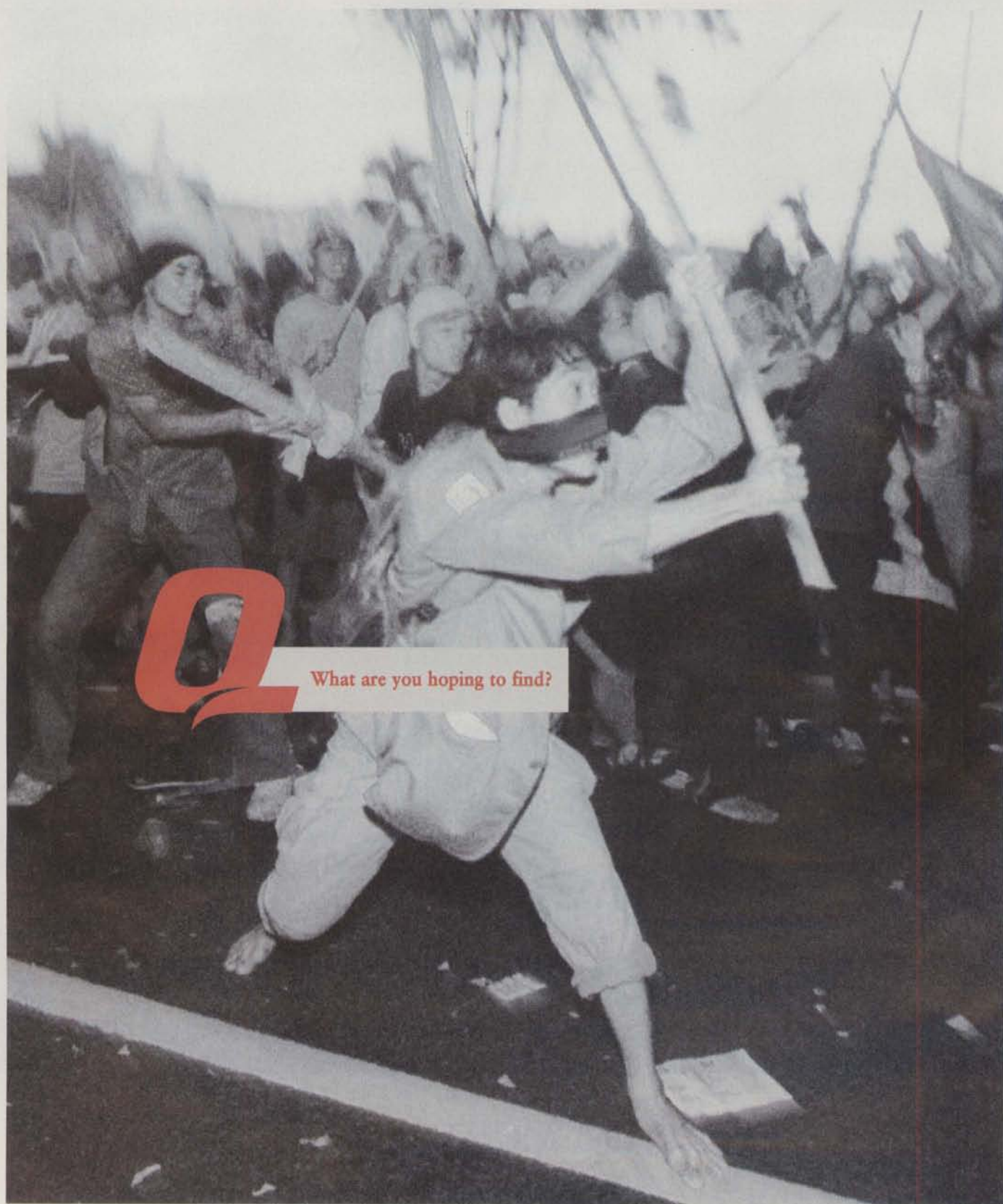
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KAREN POLGLAZE AAP

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## EDITOR'S NOTE



### Having your say

As a consumer it's natural to be peeved whenever your opinion, feedback or complaint seems to go unheeded or even unheard. And it can be annoying that corporations are often able — with assistance from their spin and marketing departments — to press on regardless of any negative feedback they may receive.

While that situation isn't going to change, sometimes as a consumer it's good to have the chance to make yourself heard in a forum holding some sway; where the total 'noise' created is greater than that emanating from the sum of the parts.

To that end, this month in APC we've published an Internet service provider survey (see page 60), which we encourage you to complete and return to us. The results from the survey will be compiled and published in the November edition of APC, in conjunction with that month's ISP reviews.

Apart from the not-insignificant fact that you'll also be in the running to win a PC, completing the survey gives you the chance to let ISPs know what you want as a customer and where there's scope for them to improve. While we're bound to hear from disgruntled customers, we also expect strong support for certain ISPs. In fact, in the past we've been more than a little surprised at the fierce loyalty shown by some customers to their specific ISPs.

Elsewhere in this month's issue, our cover feature brings you up-to-date on how the online world is changing the way we receive and listen to music, and the subsequent effects on artists, record companies and consumers. Plus, in line with the sight and sound theme, we have comparative reviews of 3D AGP graphics cards, Web development tools and colour printers under \$1,000.

Talking of printers, colour is where the action is these days for manufacturers, which must have got a fright firstly from the concept of the 'paperless office' (yeah, right), and then from the concept of a networked/online world. However, as far as I can tell, we're all still printing as much as ever.

*Steven Fear*

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## COVER STORIES



## AGP &amp; MP3

The rise of the Internet as a music distribution medium threatens to change more than just the sound of music — it will change the entire mechanics of the industry. The popularity of downloadable music is now largely attributable to the MP3 digital compression standard. This month APC looks at MP3 and the other formats available for online music distribution. We also consider whether artists are ready to face the digital challenge and the potential of online music to free them from the vice-like grip of record companies.

94

Fierce competition has led to much innovation in the 3D graphics card industry, including faster 3D chips, more and more onboard memory, and general advancements in AGP technology. This month APC reviews 19 3D AGP graphics cards to help you choose the card which best suits your needs and budget.

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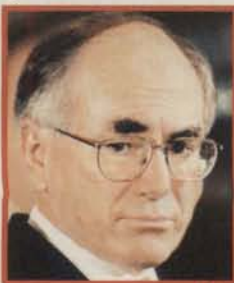


## FEATURES

## Get ready for censorship on the Net

The control of Internet access has ignited controversy in Australia on a level rarely witnessed in technology circles. Critics claim the laws will restrict freedom of speech and have a negative impact on our ecommerce future. Supporters of the legislation counter it will make the Net a safer place to visit. APC investigates just what the new laws propose and how they will change Internet use in Australia.

63



## Agent x86 reporting for duty

The processor market has undergone some dramatic changes and there could be tough times ahead if you're not Intel. National Semiconductor is exiting the PC processor business and intends to sell its Cyrix research team to Taiwanese chipmaker Via Technologies, while AMD is struggling to turn a profit. APC investigates the future of the processor market beyond Intel. Does it mean that we are likely to have a choice of only Intel in future?

85



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### WEB SITE TOOLS

#### Spinning webs

APC reviewed 10 tools to help you make your presence felt on the Web. The major low-end and mid-range Web site tools appropriate for personal and small business sites are all featured here.

Editor's Choice 94

Products in this review: 100

- Adobe GoLive 4.0
- Adobe PageMill 3.0
- Allaire HomeSite 4.0
- FileMaker Home Page 3.0
- Macromedia Dreamweaver 2.0
- Microsoft FrontPage 2000
- NetObjects Fusion 4.0
- Sausage Software HotDog Pro 5.5
- SoftQuad HoTMetaL Pro 5.0
- Symantec Visual Page 2.0



### INKJET PRINTERS

#### What's the colour of money?

Tempted by colour printing, but don't know where to start? We review nine colour printers under \$1,000 and three specialist photo printers and weigh their options to help you select the best buy.

Editor's Choice 126

Results and specifications 135

#### Products in this review:

- Alps MD-1000
- Canon BJC-4310SP
- Canon BJC-7100
- Epson Stylus Color 740
- Epson Stylus Color 900
- Hewlett-Packard DeskJet 710C
- Hewlett-Packard DeskJet 880C
- Lexmark 3200
- Lexmark 5770
- Olympus Camedia P-330E
- Polaroid ColorShot PhotoPrinter
- Sony Mavica FVP-1E

### VIDEO CARDS

#### Warning: Strong graphical content

3D graphics card innovation is being driven by strong competition. APC puts 19 of the latest and greatest video cards to the test to help you make an informed decision.

106

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#### Products in this review:

- 3dfx Voodoo3 3000
- AOpen PA3010N
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- ATI Xpert 128
- Creative Labs 3D Blaster Riva TNT2 Ultra
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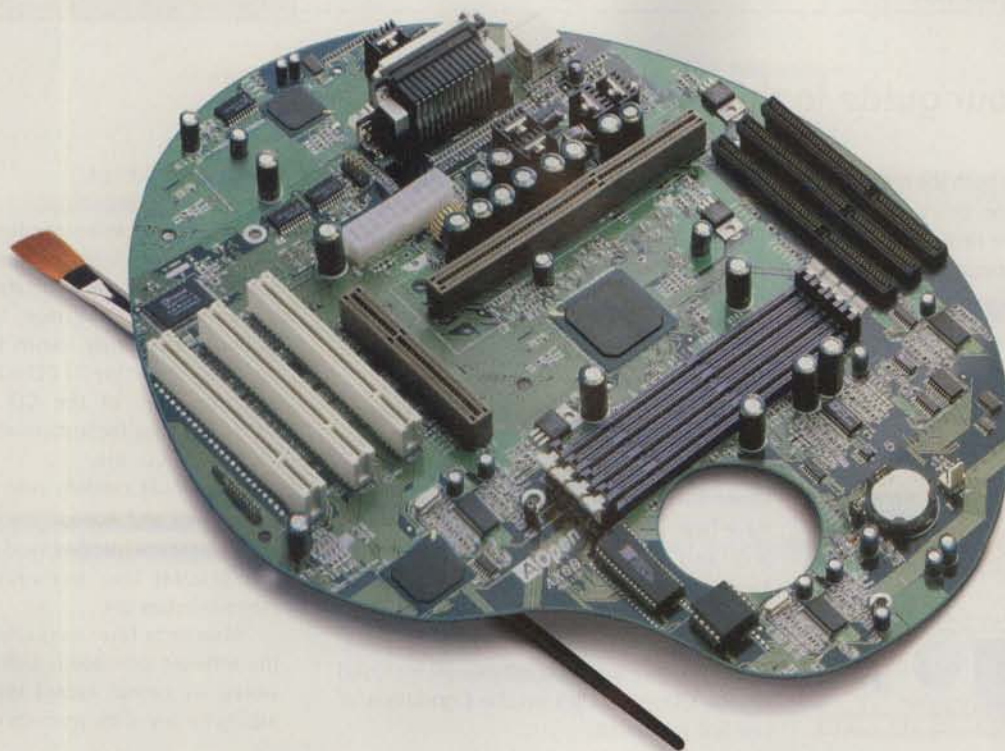
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## INTRODUCING AOPEN'S NEW MASTERPIECES: THE AX63 AND AX6BC PRO MOTHERBOARDS.

Originating from the multi-award winning AX6B, AOpen has refined and created two new motherboards, the AX63 and the AX6BC PRO.

The AX63 enjoys the superior features of the AX6B, but utilises VIA chipsets and up to 153MHz clock frequency. In addition, the PC can be turned on through the keyboard or mouse.

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**"...the best BX board on test."**

*PC @authority - Motherboard test feature June '98.*

**"...it's a dream board for performance enthusiasts."**

*Editor's Choice - APC mag - BX Motherboard test July '98.*

**"...AOpen AX6BC is a faster board than the Abit BX6-2....more stable at higher bus speed, especially 133MHz and beyond."**

*BX Boards.com - 1999.*

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## apcmag.cd: Your guide to this month's cover CD

apcmag.cd complements both the magazine and apcmag.com. Each month's double disc collection features software related to articles in that issue, as well as special CD-only fea-



tures and the latest Web browsers, OS patches and popular tools.

Each piece of software includes instructions on whether you will need to unzip the file before installing it; most also include README files. A complete list of software included on this month's discs is included below.

Everything you need to use apcmag.cd has been created in HTML. You do not need any special software to access the discs, other than a standard browser. The CDs have been tested using Netscape Navigator 3.0 and 4.0, and Microsoft Internet Explorer 3.0 and 4.0.

All software on the CDs is provided as is, without any warranty, express or implied. Complete terms and conditions are included on the CD itself; click on the Conditions of Use link for details.

### HOW TO RUN THE CDS

These CDs use an Autorun feature for Windows 95, 98 and NT systems. Just insert apcmag.cd and your browser will automatically load with the apcmag.cd front page. Users of other platforms can simply launch their favourite browser and load the file DEFAULT.HTM in the root directory of the CD. For further information, see the instructions on the back cover of the CD case.

You should carefully read the licensing agreements and honour any evaluation or shareware terms specified, read all instructions and README files, and virus-check every program before use.

While we've taken every care to ensure that the software provided is useful and that it works, we cannot accept responsibility or liability for any of the products included.

### DISC 2

#### HTML editors

APC picks two great tools to get you on the Web.

- Microsoft FrontPage 2000
- Macromedia Dreamweaver 2.0

#### You can't stop the music

Turn your PC into a pumping sound machine with the latest sound editing tools, MP3 tools and CD players.

#### Sound editing tools

Awave 5.0, GoldWave 4.02, Multiquence 1.02

#### MP3 tools

MP3Enc 3.1, MP3Spy 1.0, Winamp 2.23

#### CD players

AxelCD 2.1, CD Alarm Clock 1.1.0, CDmax 1.7.5, CD Stripper 1.02, EasyCD 2.0 Beta 3.051

#### Browsers

Microsoft Internet Explorer 5

### DISC 1

#### Safety third

Bring your pages to life with some visually stunning 3D effects.

#### 3D graphics tools

3D Magic 1.10, Bryce 4 3.1, MeshPaint 3D,

ModelMagic 3D 1.42, Ray Dream 3D 1.0.2, Realism 3D 1.5, Ulead COOL 3D 2.5, Xara3D 3.04

#### 3D screensavers

3D Beauty screensaver 2.0, 3-D Fotocube 1.42, 3D Hand Clock 1.0, 3-D Lavarium screensaver 1.8, 3D Museum screensaver 1.0, 3D Terrain Flight screensaver 1.3, Animated 3D Objects screensaver 3.6, Gravitation Cave screensaver 1.3, Liquid Desktop 1.0, Object Dropper 3D 1.0, Shooltzsaver 2.0a

#### Security and encryption tools

Guard your private documents and sensitive files from prying eyes.

A-Lock 3.7, BlackBox 2.1, DataCloak 4.3r4, Encrypted Magic Folders 99.05.4, IntraSpy 2.22, PC Spy 2.11, PC-Encrypt 4.1, RedHand Pro 4.20, ScreenLock 5.4, Shredder95 1.16, Windows Task Lock 5.1

Plus our indispensable monthly selection of Net downloads: New & Hot, Workshop and GameZone.

#### New & Hot

CallCenter 3.5.8, Interscope BlackBox 2.1, LiquidFX Professional 4.5, Net Vampire 3.3, PowerPro 1.9, ScreenTaker 2.1, The ThumbNailer 5.5, TurboZip 4.0, X-WinPro 5.1

#### Workshop

**Windows:** Xteq X-Setup 4.01, TweakJr 99 Professional 2.50, Registry Styler 99 1.14, WinBoost 98 1.30, WinConfig 3.0

**OS/2:** Entrepreneur, Bill's Unbelievably Ghastly Spaceships

**Mac:** iCab Pre 1.5, Palm Desktop 2.1, MacTuner 2.0.5, PlayItCool 3.1.7, File Buddy 5.1, DroplImage 1.5, Y2K Software Audit 1.2.8

**Linux:** SSH, Octave, GNUplot, Pizza Delivery System, LinPopUp  
Other Workshop Files: Windows Workshop, C++ files, Java files

#### GameZone

Gruntz, Sid Meier's Alpha Centauri, Star Wars: X-Wing Alliance

#### Browsers

Microsoft Internet Explorer 5, Netscape Communicator 4.6, Netscape Communicator 4.08, Netscape Navigator 4.08

### apcmag.cd August sponsors

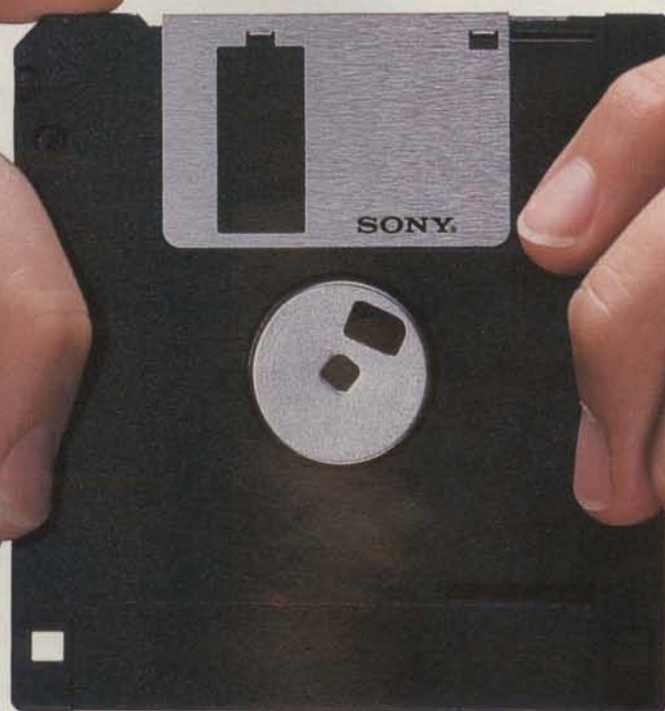
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**Disc 2**  
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Corporate Software Australia Gateway





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## COMING UP

**Fantastic Plastic:** Smartcards aren't yet mainstream, but they're getting there. Next month we'll look at some of the smartcard projects currently under way in Australia and the barriers that need to be overcome before smartcards gain currency.

**Reviews:** Jeremy Torr checks out the hottest megapixel digital cameras, while on the software side we'll look at C++ and Java development tools.

**Online banking:** Each of the 'big four' banks – ANZ, Commonwealth, NAB and Westpac – now offer their services online. APC reviews their offerings and looks at how online banking has evolved.

All this plus news, views, CDs and more in September APC, on sale August 19.

## UPCOMING CHATS

You can chat with APC staff during our regular Thursday night chats at NineMSN's technology chat room.

Upcoming chats include:

August 19	Walter Wombat
August 26	The Net censorship reality

All chats commence at 8pm AEST (please check for last-minute changes).

<http://community.ninemsn.com.au/chat/technology.asp>

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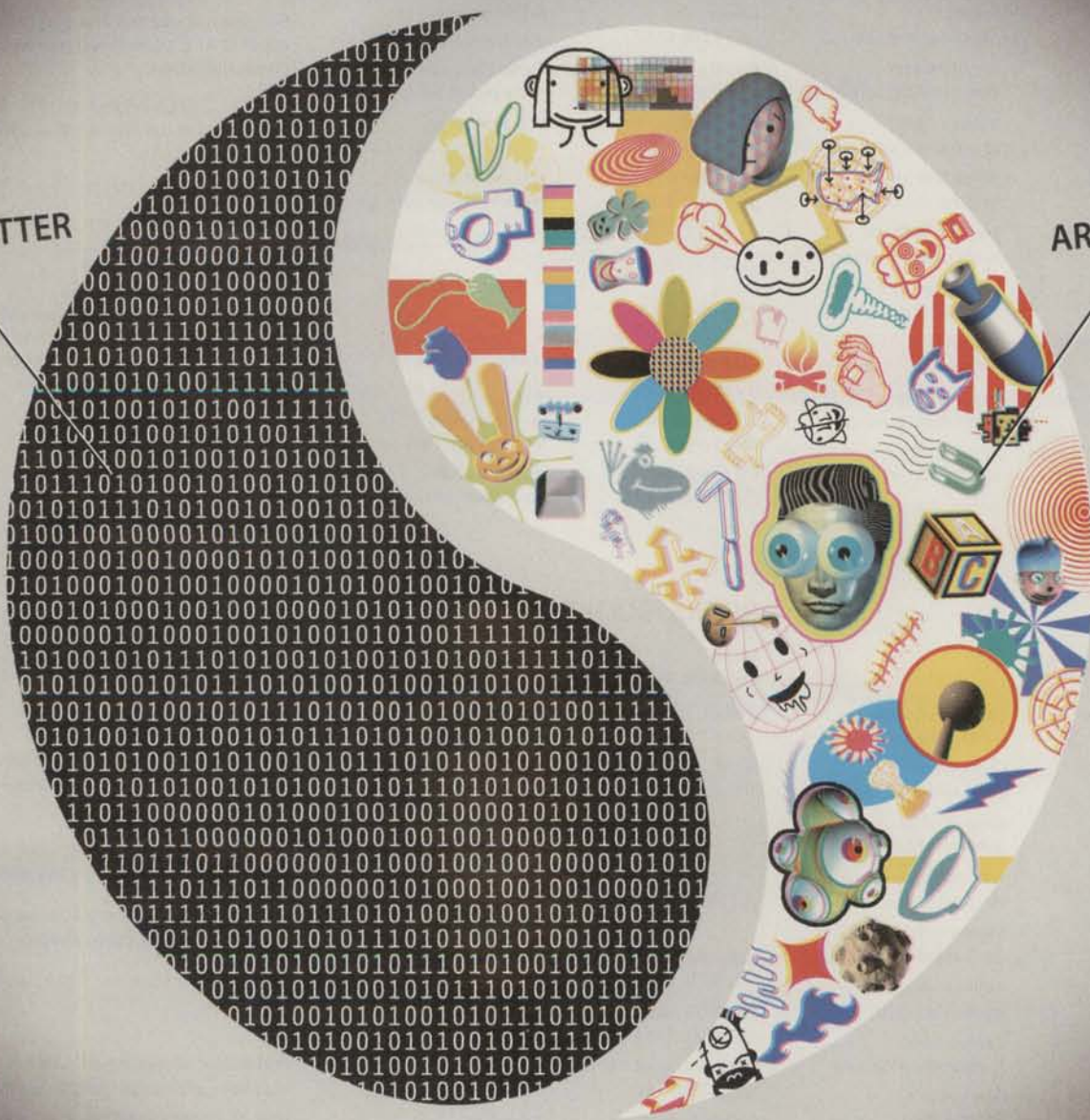
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## Net access gets fast and free

### Price wars to hit broadband

Australian Net users can look forward to increasingly cheaper high-speed Net access as Telstra and Optus ready themselves for a price war over cable Internet services. Almost four years after it first promised a cable Net service, Cable & Wireless Optus has formed a joint venture to offer broadband Net access via its cable network, currently only used for pay TV and local calls.

The joint venture, Optus@Home, is in partnership with US broadband content giant Excite@Home.

Optus@Home will use technologies developed by Excite@Home, which already has broadband cable Net offerings in five countries, combined with localised content developed by Optus. "It is, we believe, a natural marriage," said Optus chief executive Chris Anderson. Using the company's hybrid fibre/coaxial (HFC) network, download speeds of up to 3.9Mbps can be achieved.

Other details of the venture are scant. Company

Continued on page 18

### Free ISP targets online boom

Subsidised Internet service provision, a model that has revolutionised the ISP business in the UK, is about to hit Australia. At the same time, analysts are warning that ISPs face stiffer competition than ever before, despite predicted massive growth in online use by Australians.

Australians will soon be able to surf the Net for 60 hours a month at absolutely no charge, according to the founders of a Melbourne company. FreeOnline directors Sydney Low and Bill Lang will launch the service in August for Melbourne users. It will be available for Sydney Netizens in early 2000 and an Australia-wide release is planned by mid-2000. The service will use an advertising model to generate revenue, as well as fees for affiliated Web sites.

FreeOnline will be Australia's first free ISP. In the UK, users have enjoyed the country's first free provider, Freeserve, so much that it is now the country's largest. It has overtaken AOL's UK membership of 1 million, claiming 1.5 million users after just eight



months of operation. Many other ISPs have launched free services as a result.

FreeOnline's Low predicts that the "dollars per hour" subscriber model favoured by ISPs is not sustainable and would soon be gone. The service hopes to make money from affiliated Web sites it directs traffic to. It will earn \$2 for every "hour of eyeballs" FreeOnline directs to affiliated sites.

Low said companies were heavily promoting Web sites,

but consumers did not necessarily want to spend their expensive Net access time visiting those sites. "If you're going online to visit a site and possibly make a purchase, you don't want to be charged an entrance fee," Low said. "It's like being charged a fee to go into a Westfield shopping centre."

Low said it is hard to predict numbers, but hopes the service will attract 100,000 subscribers within its first 12

Continued on page 18



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## Price wars to hit broadband

Continued from page 17

officials refused to disclose the value of the deal or how many staff would be working on the project, and the target launch date for the service is still not public. Anderson would only say that Optus@Home would debut later this year.

Optus officials maintain that pricing has remained confidential for commercial sensitivity reasons and refused to divulge any details, but Excite@Home executives suggested a flat-rate pricing model would probably be used. "A key to our success has been low, attractive flat-rate pricing," said senior vice-president international for Excite@Home John O'Farrell.

Flat-rate pricing would give the Optus@Home service significant leverage against Tel-

also only be available in Sydney, Melbourne and Brisbane.

While the pricing details still need to be ironed out, Optus is exalting in the glow of finally having a concrete cable Net plan, after promising such a service since 1995. "This joint venture gives us a significant boost in the high-speed cable and modem area," said Anderson. Content partners for the deal have also not been revealed, although Anderson said further announcements would be made shortly. One obvious target is Excite Asia-Pacific, a joint venture between Excite@Home and local media company LibertyOne, but it currently licenses most of its local content from other content providers.

"We don't think that content is difficult to attract," said Anderson. "It's a dream e-commerce opportunity."

Telstra, meanwhile, isn't resting on its laurels. Shortly after the Optus plans were unveiled, Telstra announced that it will offer high-speed Internet services in Queensland, which had been deprived of the service despite the fact that Telstra's rival cable network was in place. The Big Pond service is now available to about 400,000 homes with cable access in Brisbane and on the Gold Coast. Telstra plans to extend the service to regional Queensland at a later date.

Telstra also launched a range of new cable Internet pricing plans, although these are still based on download volumes. Package plans start at \$95 a month.

Telstra is also trialling its own broadband technology, including satellite and Asymmetrical Digital Subscriber Line (ADSL). The company hopes to eventually use these services to improve its patchy cable Internet coverage in NSW and Victoria.

**Angus Kidman and William Maher**

## Free ISP targets online boom

Continued from page 17

months. He is optimistic that the business would be "cash-flow positive" after its first year of operation.

Whether or not 'free' ISPs take off, the Australian ISP market is heading for dramatic consolidation and the elimination of smaller providers, two industry analysts have predicted.

IT analysts David Parsons and Neil Hymans said that as larger ISPs evolve into telecommunications carriers offering a suite of communications services, a shake-out in the local ISP market can be expected.

### Consolidation

With more than 650 players jostling for position, Hymans believes the Australian marketplace will soon mirror trends already established in the US. He said that as the local industry follows the US shift away from independent operators towards dominance by national and transnational providers, the smaller players are likely to disappear.

Parsons attributes this industry consolidation to the changing nature of the services being provided by the larger players. He said that as ISPs expand their services into the telecommunications sector, they will come to dominate the market.

"Statistics are predicting that the most growth is occurring within the big ISPs, particularly the telcos," he said. "Telcos are about to roll out networks to support data, like the enhancements to the GSM and CDMA networks. They will all be chasing data customers."

Parsons believes the players that simply provide access to the Internet will be the primary casualties of this consolidation. "The guy who sticks with banks of modems won't be seeing new customers and will gradually wither away."

Parsons said that it was difficult to put an actual figure on the newly consolidated ISP market. "I think you would see a big consolidation, down to a small number of big players," he said. "The amount of people who just provide access to the Internet is going to drop dramatically. There may be half-a-dozen real ISPs left in the form that they exist today." He said that in addition, there would be "hundreds" providing a range of services.

Demand for those services also seems set to soar. The Australian Bureau of Statistics (ABS) has revealed a huge jump in local Internet use; nearly 5 million adult Australians accessed the Net in the 12 months to February 1999. There were almost 1.3 million households online at that time, an increase of 50% since February 1998. The ABS study also found that 90% of those households accessed the Internet at least once a week.

The figures represent a huge shift in Internet use since the 12 months to February 1998, when only 3 million adults were online. Perhaps the biggest factor for the change has been the increase in Net use by 18 to 24 year olds, with 65% online in February 1999, up from 42% in February 1998.

Internet use is still dominated by urban residents and, to a lesser extent, men. More adults accessed the Internet from capital cities (42%) than from other areas of the country (27%). Nearly 39% of adult males (2.6 million) had accessed the Internet, while 35% of the female population (2.4 million) accessed the Net during this period.

**William Maher, Cosima Marriner and Roulla Yiaccoumi**

See our News Analysis piece 'No such thing as a free PC' on page 24



stra's rival Big Pond Advance service, which has charges based on the volume of material downloaded. This has proved unpopular with many Net users. Most estimates place the number of people using the Advance service at between 5,000 and 15,000.

The new service will take some time to roll out, according to chief commercial officer Paul Donovan. "It's our intention to achieve economies of scale... by rolling out the network on a node-by-node basis," he said. Such a process could take up to 12 months, he predicted, raising the possibility that some current cable customers might not see Internet access before 2001. It will



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## SEEKING A BETTER DEAL

## Do IT workers need an industrial award?

For the first time, IT workers in Australia are covered by an industrial award, but not everyone believes it will necessarily improve working conditions.

The Information Technology Industry (Professional Engineers) Award 1999, the first to be introduced in the Australian IT industry, provides formal bargaining powers for IT professionals with engineering qualifications. The award outlines working conditions such as salaries, hours of work, leave and redundancy.

Under the new award, IT professionals will be represented in work disputes by the Association of Professional Engineers, Scientists and Managers, Australia (APESMA). APESMA has approximately 25,000 members in Australia (approximately 5,000 work in the IT industry).

Approximately 130 IT companies have already indicated they will be party to the award, including Toshiba, IBM, Fujitsu and Hewlett-Packard, said Bruce Nadenbousch, industrial relations director for APESMA.

However, the Australian Information Industry Association (AIIA) has thrown doubt on the relevance of a new industrial award for IT

workers. CEO Peter Upton said the award was "limited in scope", while spokesperson Michael Hedley made it clear that the AIIA is "not necessarily supporting the award at all".

Hedley questioned the relevance of the award, as there are many contract workers in the industry who will be unaffected by the regulations, since they negotiate each contract on an individual basis.

He also argued the enterprise bargaining and tribunal process could be too lengthy to work effectively in the local IT industry. "Extensive negotiations... would slow down the opportunity for the Australian software industry to be fleet-footed," he said.

Law firm Deacons Graham & James has warned IT companies that the award will give employees the power to call on industrial tribunals or unions in the event of formal enterprise bargaining. Company director Alistair Salmon said the award could be used by employees involved in unfair dismissal claims.

"IT employees... can for the first time, use federal laws in this area to protect their rights, regardless of their level of remuneration," he said.

**William Maher**

## WIRED WHITEGOOD

## Telstra's Net fridge

It might be the stupidest concept since chilli chocolate, but Telstra has put its name behind the first Internet-enabled fridge in Australia.

The wired whitegood was demonstrated to the Australian media last month by Telstra officials. Although only a prototype, the device includes an onboard touch screen, Web access, email and barcode scanner. The unit can also be used to control household lighting, alarms and air-conditioning through home automation systems.

The high-tech appliance is a joint development between whitegoods manufacturer Email and Telstra. Both companies are still working on commercial versions of the product and expect the first retail units to be available in the next two to three years.

While officials were not revealing too much about the fridge's inner workings, **NewsWire** was able to uncover a few interesting facts.

Investigations revealed that the demonstration model was running under Windows 95 and used Internet Explorer for Web and email access. The fridge, for the record, is

based on a Westinghouse Frost-Free Mastermind.

Not only do Telstra officials believe the Web fridge is a good idea, they also believe it has substantial application beyond simple email and data access. "In terms of telecommunications, the fridge is a wonderful thing. It's a data bank, messaging system, notification device, scheduler... and a number of other things," said Telstra manager of mobility services Garth Price.

Telstra is also hoping the device will attract interest in the new Wireless Application Protocol (WAP) for mobile phones and data devices. Both Telstra and Optus are planning WAP-based Internet access for mobile phone users later this year, and are hoping that the protocol will be used to interact with online devices such as the Internet fridge.

**William Maher**



Is this really making life easier?

## News Roundup

Following the passage of GST legislation, the Federal Government has begun the hard slog of selling the benefits of the much-modified package to the public, and IT is one of the first sectors to be targeted. Senator Ian Campbell, parliamentary secretary to IT minister Senator Richard Alston, said that the new tax, together with previously announced funding from the sale of Telstra, would bring the benefits of the information economy to more Australians.

"The removal of the 22% wholesale sales tax on computer hardware under the new tax system will see the price of PCs slashed between eight and 12%," said Campbell.

Not everyone is convinced. Australian Internet startup OzBooks.com has criticised the GST, claiming it will hurt local Internet retailers. The company's CEO Raphael de Montero said the sales tax would make it difficult for local Internet retailers to compete with US giants like Amazon.com. He claims that

the Federal Government's decision to introduce the GST showed a lack of support for the local Internet community. Despite those concerns, OzBooks.com has managed to gain the support of major companies like Penguin, HarperCollins and NineMSN.

The Federal Government has abandoned its plans for a National Authentication Authority (NAA), opting instead for a low-key approach in the provision of electronic authentication standards. IT minister





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## ASX TECH FLOOD

# IT floats continue to flood market

Continuing dire predictions of Internet stock doom haven't dimmed a newfound enthusiasm among Australian IT firms for listing on the stock exchange.

Australian Web developer Spike has released details of its much-hyped initial public offering, amid claims it could outstrip conventional media players such as Disney.

In an offer underwritten by Salomon Smith Barney, Spike is issuing 22.5 million shares (24.6% of its stock) at \$1.45 each. This will raise \$32.6 million for the company and see it list on the Australian Stock Exchange (ASX) with a market capitalisation of \$123 million. Included in its prospectus is an over-subscription option, allows the company to raise an additional \$3 million if demand for the stock proves high.

Meanwhile, online retailer of adult products AdultShop.com snuck onto the ASX in June and plans to list on the Berlin Stock Exchange.

Through its acquisition of mining company Western Minerals, AdultShop.com has gained a backdoor listing on the ASX. Managing director Malcolm Day said the purchase allowed AdultShop.com "to get on the ASX a lot quicker than a standard IPO".

Regional pay TV operator Austar Entertainment has also announced plans to list. The listing is scheduled for July 20 following an initial public offer of 90 million shares at \$4.10 to \$4.70 per share. Austar's US parent company, UnitedGlobalCom, plans to maintain control of 77.5% of the company after the offering.

The big winner from the Austar float will be the company's Saturn network, which provides integrated pay TV, telephony and Internet services in New Zealand. Austar plans to use the proceeds of the ASX listing to complete the network in Wellington and may also extend the service to other areas.

Not everyone is so keen to race in, though. Web developer Nextacom is cooling its heels while it waits for the right time to list. The company has called for expressions of interest in purchasing 5% of the company's stock, but doesn't plan to list until November.

However, when Fairfax chief executive officer Fred Hilmer announced the company had appointed advisers to investigate the possibility of listing its online arm, shares immediately rose by more than 32 cents.

**Cosima Marriner**

## Cashbook

Selling off unprofitable business arms has proved a popular Silicon Valley strategy. National Semiconductor has managed to find a buyer for its troubled Cyrix PC processor division, announcing in late June that it had signed a letter of intent with Taiwanese chipset manufacturer Via Technologies to sell the business. (For a full analysis of the new state of the processor market, see page 85.)

Compaq has also ended long-running speculation about the future of AltaVista, announcing a \$US2.3 billion sale to CMGI. As part of the deal, CMGI will take an 83% ownership stake in AltaVista and acquire control of Zip2 and Shopping.com — which Compaq bought for \$US220 million in January. Compaq will retain the other 17% of AltaVista and will take a 16.4% equity in CMGI — the largest stake of any outside shareholder. In Australia, the sale will have no effect on plans to launch an extensive media campaign to promote the local AltaVista site, according to officials.

Local accounting software developer Solution 6 has signalled plans to make a new push into the knowledge management sector after announcing its purchase of local systems integrator CVSI. The company will pay \$15

million to acquire CVSI's Australian and Singaporean operations from the parent CVSI US organisation. Solution 6 CEO Chris Tyler said the acquisition is part of a drive by the company to increase services revenue and alleviate staff shortages.

And a final market aside: An Australian company which has registered nasdaq.com.au has been sent a 'cease and desist' letter by the US stock exchange. Ecommerce company Sprint, which owns 382 domain names, registered the nasdaq.com.au name on June 15. Sprint CEO

Domenic Carosa told

**NewsWire** that nasdaq.com.au had been registered locally to offer Australians information about Nasdaq, the exchange most major IT companies trade on. However, Nasdaq spokesperson Scott Peterson said Nasdaq had not been aware the nasdaq.com.au domain name had been registered in Australia and would seek to stop the site.

"They have infringed upon the Nasdaq trademark. We have sent a cease and desist letter," he told Cashbook.

For up-to-the-minute financial news from the IT sector, check out Newswire's continuously updated Cashbook service at <http://newswire.com.au/cashbook/>



## News Roundup

Senator Richard Alston has instead announced government plans to form a National Electronic Authentication Council, which will coordinate authentication-related activities, oversee standards development and provide guidance and education to consumers. This will replace the NAA, although many have criticised the proposal's lack of government involvement.

As corporate use of the Internet and email increases, so are computer viruses, a

Morgan & Banks survey has found. Of the 1,000 companies surveyed, 52.9% reported they had been affected by a virus in the past 12 months. Melissa, Worm Zip and Wobbler are just some of the viruses that have wrought havoc with corporate IT systems recently. More than half the companies surveyed said they had lost time because of a virus, while one in four said they had lost work.

Newspaper giant Fairfax has launched an Internet auction site called Sold.com.au,

adding to a growing list of online auction services in Australia. Sold.com.au will charge sellers \$1 to register each auction item and then a further 3.5% commission for every item sold. The Fairfax service comes just months away from a planned Australian site by US online auctions giant eBay and follows other recent launches.

For complete versions of these and many other stories, be sure to check into <http://newswire.com.au>.



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Subsidised PC and Net access packages are all the rage with retailers.  
But are they actually good value for money?

# No such thing as a free PC

In a move that marks the biggest change to the sale of computers since the emergence of the mass-market retail segment, Australian PC vendors have raced to embrace a new payment scheme that offers consumers a free or extremely low cost machine in return for a long-term ISP contract.

The sales model, similar to that used with mobile phones, involves the payment of a small fee for PC hardware in conjunction with a fixed price Internet access plan for a number of years. (Such a model differs radically from similar 'free PC' schemes promoted by US vendors online, which include proprietary software to display continuous advertising on the PC desktop. No such schemes had been launched in Australia at the time of writing.)

Although EISA was the first firm to launch a subsidised package, in January this year, the schemes came to prominence in late June when both Harvey Norman and Myer Grace Bros entered the field. Harvey Norman is offering an IBM Aptiva sporting an AMD K6 380MHz processor, 32M of RAM, 4G hard drive, 15in monitor, 56K modem, a network card, and a bundle of software for a zero down payment, followed by 30 months of \$79.95 Internet access payments, making a grand total of \$2,398.50. (As an aside, Harvey Norman is consciously trying to avoid the phrase 'free PC', opting instead for 'zero-dollar'.)

The Myer Grace Brothers 'Big Net Set' package consists of a Hewlett-Packard Pavilion 4411 machine with Net access from Optus. The machine has similar specifications to that of the Harvey Norman unit, except it has a different processor (Intel Celeron 366MHz) and no network card. It also costs more and takes three years to pay off. Buyers have two options: pay \$299 now and \$79.95 each month for three years (\$3,177.50), or pay \$1,699 and \$26.39 each month for three

years (\$2,649). The latter option saves the consumer more than \$500.

Both retailers are heavily promoting the fact that the packages include brand name machines. "People shouldn't feel they have to opt for a no-name computer just so they can afford it," said Myer Grace Bros computer buyer Peter Geer. Harvey Norman's computer honcho Tony Gattari said the price of PCs had previously prevented "cash-poor customers" from making the technology investment.

Harvey Norman and Myer Grace Bros both claimed a virtual sellout within the first week. Other retailers have also outlined plans to offer subsidised systems; even notebook vendor Toshiba is considering entering the market. Gattari has predicted that subsidised buying will quickly become the standard for home PC purchases. But are the deals all they're cracked up to be?

## Lessons of history

The first thing potential buyers need to recognise is that PCs, unlike mobile phones, tend to date rapidly and will lose virtually all their value over the life of a three-year contract. For instance, in November 1996, direct PC vendor Dell sold a Pentium 166MHz machine with 16M of RAM, 1G hard drive and 15in monitor for \$3,899. Just four months later, the same system sold for almost \$1,000 less, at \$2,915. By the end of 1997, Pentium 166MHz wasn't even in Dell's vocabulary.

Declining PC values is a widely recognised problem (regardless of how you choose to buy a machine), but a less obvious flaw is the Internet access included in such schemes. While \$79.95 a month might seem reasonable for Net access, that situation is unlikely to last. ISP costs in Australia have fallen dramatically in recent times. Three years ago, 150 hours of Internet access with OzEmail cost \$375; today, 150 hours with OzEmail costs just \$34.95 (see table for some other examples). If the cost of

ISP services three years from now follow this pattern, \$79.95 will seem an awful lot.

Checking the fine print is also



essential. For instance, the "unlimited Internet access" packaged with Harvey Norman's package 'zero-dollar' PC is not so unlimited after all. A spokesperson for One.Net, the company providing the access, told APC the "unlimited" plan actually had a 100M download limit per month. If users exceed this limit, there is a flat hourly charge of \$1.95, charged in 15-minute increments. Users are not notified if they have exceeded their monthly limit. However, they are able to check their use in a designated area of One.Net's site.

Support costs are also high; One.Net technical support costs \$9.50, which entitles the user to support for a period of 72 consecutive hours from time of purchase. Prospective customers might also wish to note that as recently as last November, APC readers voted One.Net as the worst ISP in terms of access, billing and customer service in the magazine's annual Service & Reliability survey.

Despite these concerns, retailers appear likely to continue with this model. If you plan carefully, it may prove the best way for you to purchase a PC, but you do need to carefully assess any deal before signing up. Do extensive calculations before jumping into any contract and make sure you understand the penalties if you decide to opt out before your time is up.

**Roulla Yiacoumi**

## The changing cost of ISP access

ISP	Hours	Cost in 1996	Cost in 1999
OzEmail	150	\$375	\$34.95
CompuServe	40	\$236	\$99
Microplex	15	\$60	\$24.95

Source: APC



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It's easier than ever for Australian technology firms to list in the US, but are they ready to face the challenge?

# Nasdaq: Be prepared or be killed

Australian technology companies appear undecided about the merits of a new scheme by the Australian Stock Exchange (ASX) to make it easier for them to list on the US Nasdaq exchange. Few appear to have concrete plans to take advantage of the new opportunity.

The two exchanges announced plans to develop a range of co-listing and co-trading services in mid-June. Under the scheme local companies could choose to list on both exchanges simultaneously, taking advantage of the more developed approach to technology stocks in the US, while retaining a local presence.

Nasdaq also plans to license its Nasdaq 100 Tracking Index Stock, a unit trust that moves in line with the performance of major firms listed on Nasdaq, to list on the ASX. The tracking stock is dominated by technology firms. The deal has been negotiated since December last year and will involve the two exchanges integrating their trading systems so that stocks listed on one exchange can be traded using the system developed by the other.

To date, many technology companies have expressed a reluctance to list in Australia because of the greater potential gains to be made in the US. Portal site LookSmart, for instance, has chosen to go with a Nasdaq listing. However, while some people on the local IT scene believe there are many rewards to be reaped from a Nasdaq listing, others warn against racing offshore.

Wayne Bos, director of Sausage Software (pictured middle), the first Internet technology company to list on the ASX, is among the doubters. "Not everything revolves around the US and Nasdaq" when planning a float, he said, despite the perception in the Australian marketplace that any small company can list on Nasdaq and easily make a lot of money.

"I'm not sure that's the right perception," he said. "I'd be advising that they need to understand their business model and their market more than wondering about how much money they can make on Nasdaq."

Bos said the ASX announcement would not have any major influence on Sausage's future plans. "We're considering all sorts of things regardless of new concepts," he said. However, he did not rule out the possibility of a future Nasdaq listing. "I'm very broad-minded; whatever is right for the shareholders I would consider."

Global sales and marketing manager for accounting firm Solution 6, Richard McLean (pictured bottom), also sees benefits in an ASX listing. "There is value in being listed in your home market," he said. "It's safer and a lower cost." McLean said being listed on the ASX helped promote Solution 6 in the local market.

It's not a perfect arrangement, though. McLean believes the value of Solution 6 is not accurately reflected in its ASX stock price. He said this was because the Australian market has difficulty understanding the global nature of Solution 6's business. In that respect, he said, Solution 6 would benefit from a Nasdaq listing because it is "the market that best understands technology companies".

Earlier this year, Solution 6 attempted a 'backdoor' listing on Nasdaq through its failed bid for PC DOCS. However, McLean would not comment on whether the ASX announcement would have any effect on further plans for a Nasdaq float, other than to say the company was studying the implications of the announcement. "If it allowed us to get a more accurate valuation of the company for our shareholders, then we'd consider it."

Those Australian companies with imminent ASX floats were even more reticent about commenting on the ASX/Nasdaq alliance. LookSmart representatives said the sensitive timing of its float and associated legal obligations prevented the company from commenting.

Web design shop Spike was also reluctant to comment prior to its own ASX listing, but said a Nasdaq float was unlikely.

"Spike in our own market is a significant entity," said CEO Chris O'Hanlon. "As a corporate entity we're ready to list here." However, O'Hanlon said certain operations in LA could be looking at an independent Nasdaq listing this time next year.

E\*Trade Australia's general manager of marketing, Bill Wileman (pictured top), sees potential in the arrangement. E\*Trade Australia is an ASX-listed company, while its licensor E\*Trade is listed on Nasdaq. This could provide some interesting cross-listing arrangements, but Wileman declined to comment in detail on the implications of the new plan.

Perhaps the company in the best position to comment is ISP OzEmail, a veteran of the listing process. OzEmail was the first Australian company to list on the Nasdaq in 1996, when OzEmail was still in its relative infancy. Two years later, the company floated on the ASX in a compliance listing.

OzEmail chief financial officer Ian McGregor said the Nasdaq/ASX deal would not have altered the course OzEmail took. "If we had gone out to the Australian market to raise millions of dollars as a company that had been trading for less than six months, with minimal revenue and no profit, we would have been laughed at," he said. "The chances of listing on the Australian market and being successful are small, because the market is so small."

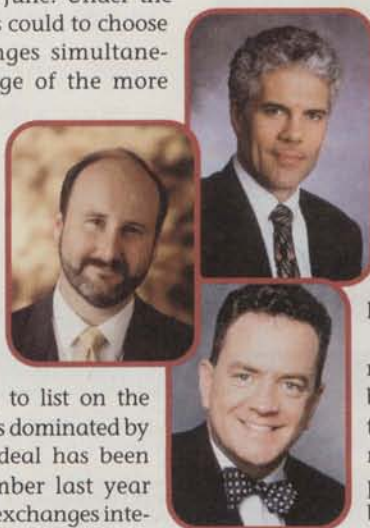
Not everyone views the ASX so negatively. Sausage's Bos said the company had found the local market responsive to technology stocks.

McGregor attributes the difference in markets to the fact that US investors have more funds, are bigger risk takers and have a venture capitalist mentality. Despite that, though, he's not convinced local startups will favour Nasdaq over the ASX.

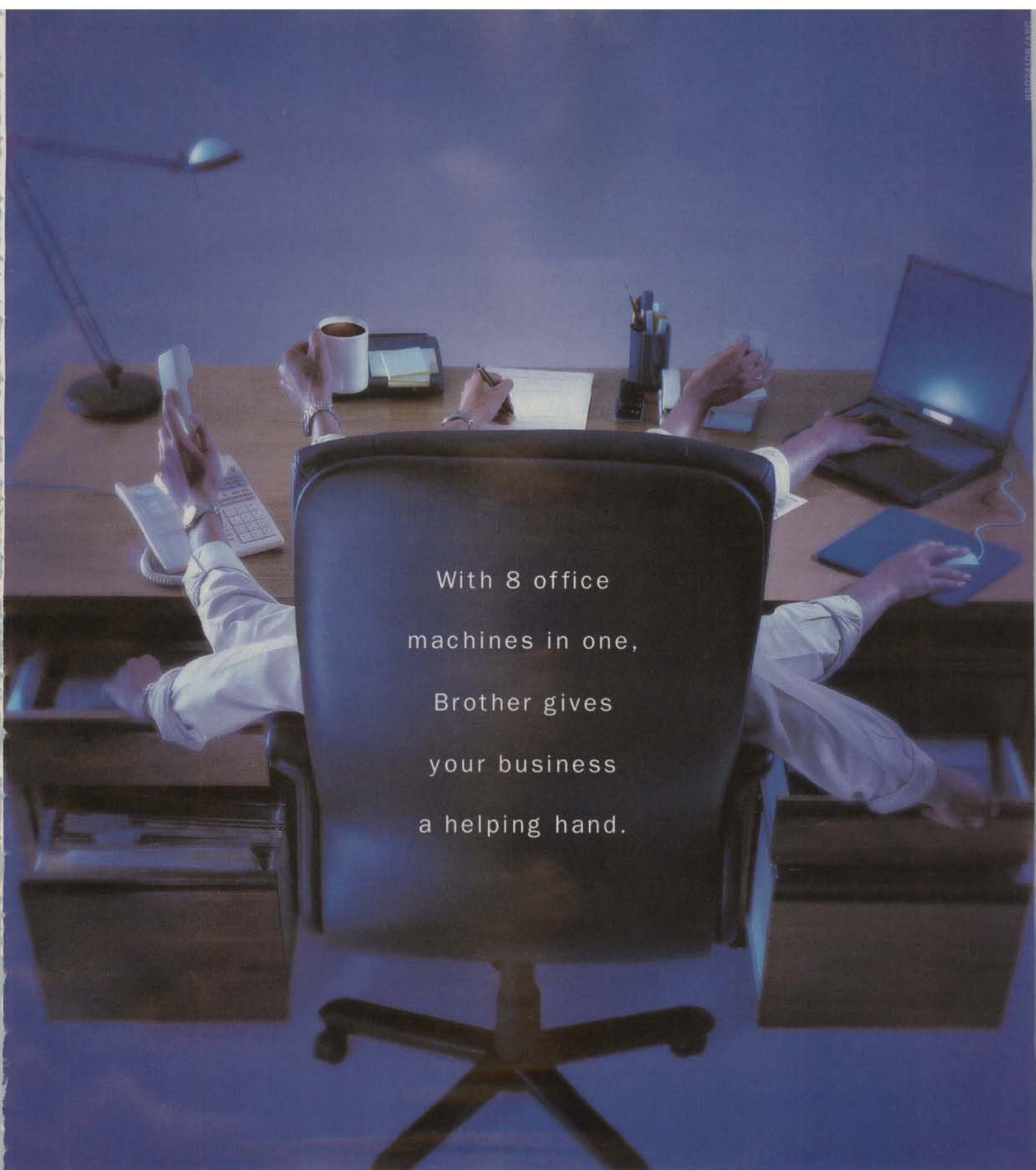
"It's much more expensive," he said. "You can raise much more equity on Nasdaq. But the fee you pay is relative to the amount of money you can expect to raise."

He agreed that the amount of capital to be raised might lure companies across to Nasdaq. "But you have to have a good story," he cautioned. "Otherwise they'll kill you."

Cosima Marriner







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## DELL INSPIRON 7000 AND GATEWAY SOLO 9150XL

# 400MHz notebooks

Frequent readers of *APC* will not be at all surprised to see Dell and Gateway systems in First Take. Because of their direct sales model, these vendors always manage to integrate the latest technologies and deliver systems just a little earlier than other vendors. In this case, the new technology is Intel's new 400MHz Mobile Pentium II processor.

Intel's Mobile Pentium II is the first x86 processor to be manufactured using a 0.18 micron process, which means the finest detail in the processor chip is a minuscule 0.18 microns wide. Until now, Intel and its competitors manufactured their chips using a 0.25 micron process. The process allows Intel to reduce the size of the chip or fit more components on the same-sized chip, while reducing the chip's power consumption. Intel is concurrently producing both 0.18 and 0.25 micron versions of the 400MHz Mobile Pentium II, but both on the same size chip — make sure you know the difference.

Both of the notebooks we reviewed have the 0.25 micron version of the 400MHz processor. At review time, Intel had yet to roll out the 0.18 micron version of the processor and most notebooks will still be based on the 0.25 micron chip for some time. While there will be no difference in performance, the difference in power consumption will affect battery life: the 0.25 micron chip outputs 9.2W and runs at 1.6V; the 0.18 micron chip outputs only 7.5W and runs at 1.5V.

There's very little to separate these two

notebooks; reading down the specifications table you will notice more similarities than differences. Both have 15in TFT screens (delivering the same viewing area as a 17in monitor), 14.1G hard disk drives, an internal modem, a DVD-ROM drive and an ATI Rage LT Pro video card. Both are obviously aimed at the high-end market and are fast and capable enough for almost all power users. They are also both intended as desktop replacements.

The Gateway costs \$422 more than the Dell, but you get a great deal more versatility. Where there are differences in specifications, the Gateway almost always comes out ahead. The Gateway has 128M of memory, compared to the Dell's 64M. The Dell has a floppy drive and the Gateway has an LS-120. Dell ships the Inspiron 7000 with the Microsoft OEM Works Suite pre-installed, while Gateway includes Corel's WordPerfect Suite 8. Although it isn't the latest version, WordPerfect is a functional and comprehensive office suite; the same cannot be said for Works. To top it off, the Gateway not only has composite and digital video output, but also composite video input, which can be used for video capture.

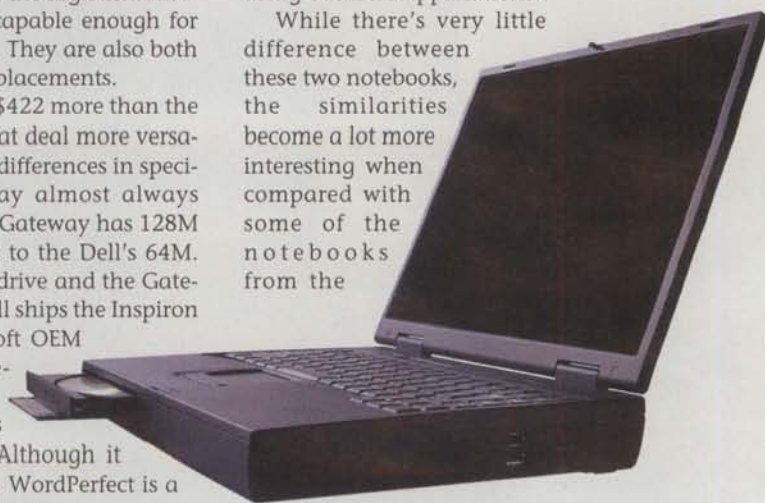
Gateway's keyboard feels like a standard notebook keyboard; small action and a very clicky feel. Dell's keyboard has a bit more action and resistance, and feels a lot more like a desktop keyboard.

Physically speaking, the Dell is a brick. It weighs in at 4.7kg, including the power pack. Be prepared for a sore shoulder if you plan to take it home after work. At 4.3kg including the power pack, the Gateway isn't far behind. While the weight may be a pain, it adds portability in the sense that a larger, heavier battery lasts longer. The Dell made it past the four-hour mark in the Ziff-Davis Battery-Mark test, and the Gateway's battery lasted nearly as long.

There wasn't a lot of difference between the two notebooks in terms of performance. Despite the memory difference, the two notebooks achieved practically identical scores in the

CPUmark32 and FPU WinMark processor tests. They were fairly evenly matched in the disk tests, while the Dell had a slight advantage in graphics performance. The Gateway had a slight edge over the Gateway in the Business Winstone 99 test, which measures overall performance using business applications.

While there's very little difference between these two notebooks, the similarities become a lot more interesting when compared with some of the notebooks from the

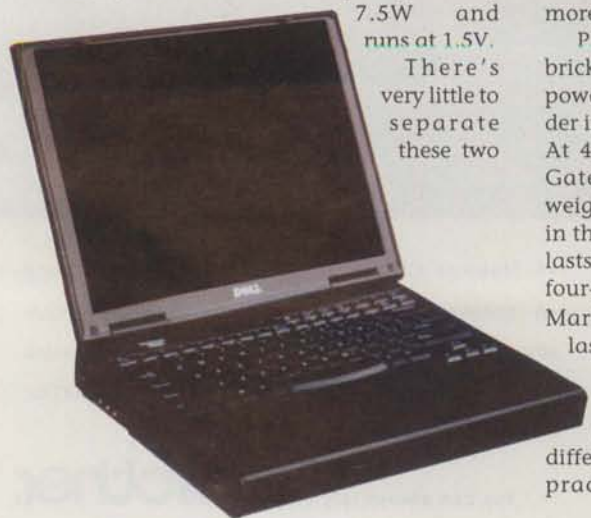


vendors we reviewed in June. We've said it before and it's worth saying again: notebooks produced by Dell and Gateway undercut those from big name vendors like Toshiba, NEC and IBM by as much as \$3,000 without sacrificing performance.

Both of these notebooks significantly outperformed the high-end notebooks reviewed by *APC* in June from IBM, NEC and Toshiba (See *APC* June 1999, page 123). To be fair, the notebooks reviewed by *APC* in June had 366MHz processors. However, it's not a great leap of faith to assume that those vendors' 400MHz notebooks, when available, will have 14.1in screens and be in the \$9,000 to \$10,000 price range. Even if their performance matches those of the Gateway and Dell notebooks, they will be significantly more expensive and will have smaller screens.

If you need multimedia capabilities, then the Gateway is probably a slightly better choice, but both of these notebooks beat the pants off anything else that *APC* has seen.

Josh Mehlman





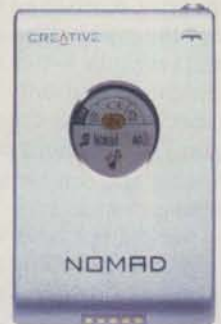
Product	Dell Inspiron 7000	Gateway Solo 9150XL
Distributor	Dell	Gateway
Phone	1800 335 502	1800 500 338
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Price	\$6,277	\$6,699
Warranty	1 year	1 year
<b>Specifications</b>		
Processor	400MHz Intel Pentium II	400MHz Intel Pentium II
Secondary cache (K)	512K	512K
Ram and type	64M SDRAM	128M SDRAM
Maximum RAM	384M	384M
Hard disk drive	14G Ultra ATA Intel 82371AB/EB PCI Bus Master	14G Ultra ATA Intel 82371AB/EB PCI Bus Master
Hard disk controller	IDE controller	IDE controller
Hard disk file system	FAT32	FAT32
Video bus type	AGP	AGP
Video RAM	8M SGRAM	8M SGRAM
Video controller chip	ATI Rage LT Pro	ATI Rage LT Pro
Pointer device	Touchpad	Touchpad
Dimensions (cm) (H by W by D)	5.4 by 32.8 by 26.7	5.6 by 32 by 26
Bare minimum weight	4.3kg	3.9kg
Travel weight	4.7kg	4.3kg
PC card slot type	2 Type II or 1 Type III	2 Type II or 1 Type III
Port replicator	\$305	\$199
CD-ROM drive/DVD	DVD-ROM	DVD-ROM
Soundcard	Sound Blaster compatible	Crystal
Internal modem	Internal 56K V.90	Internal 56K V.90
Display	15in TFT	15in TFT
Maximum internal resolution (dpi)	1,024 by 768	1,024 by 768
Battery type	Lilon	Lilon
Carry case included	No	Yes
OS available	Windows 98, NT 4.0	Windows 95, 98, NT 4.0
Expansion slots	1 parallel, 1 serial, 1 PS/2, 1 IR, 1 VGA, 1 USB, 1 game	1 parallel, 1 serial, 1 PS/2, 1 IR, 1 VGA, 2 USB, 1 game, Dolby Digital audio output, composite video in and out
Other inclusions	Microsoft OEM Works Suite	LS-120 drive, Corel WordPerfect Suite 8
<b>Benchmark Results</b>		
CPUMark32	1,030	1,020
FPU WinMark	2,130	2,140
Business Disk WinMark 99	2,470	1,985
High-End Disk WinMark 99	7,450	7,810
Business Graphics WinMark 99	133	83.8
High-End Graphics WinMark 99	323	307
Business Winstone 99	18.6	19.5
BatteryMark: rundown time (hours:minutes)	4:01	3:52

The products used in these tests are shipping versions available to the public at the time of publication unless otherwise stated. Winstone, WinBench and associated products are registered trademarks of the Ziff Davis Publishing Company. These tests were performed without independent verification by Ziff-Davis and Ziff-Davis makes no representations as to the results.

## Creative Nomad

MP3 players like Diamond's Rio and the MPMAN are portable devices designed to play digital MP3 music files downloaded from a PC or the Internet, or taken from an audio CD. While they are certainly interesting pieces of technology, these products have been criticised in the past for their lack of audio quality and storage capacity.

The Creative Labs Nomad is a step forward, but perhaps not quite far enough. The product is an improvement in terms of style and packaging; it is even smaller than the Diamond Rio and MPMAN and sports a high-tech looking silver magnesium case. This device is sure to stand out in a crowd. But the biggest improvements are the addition of several new features such as a voice recorder, FM radio tuner and data storage.



Voice recording is suited perfectly to a device like the Nomad. The 64M version can store up to four hours of voice audio, which can then be uploaded to a PC in a matter of minutes. It should be noted, however, that voice quality is poor and only suitable for taking notes. The FM radio tuner is also a cause for concern. The radio just doesn't have the power to maintain a decent reception and obviously needs a strong inbuilt antenna. The Nomad would also benefit from the addition of a USB connection for PC file transfers.

When it comes to storing and playing MP3 music files, the Nomad is essentially the same as its competitors. While Creative Labs claims that the 64M version is capable of storing up to two hours of audio, testing found the truth to be a little more complicated. To be fair, the problem is inherent in the MP3 format itself and not the Nomad. MP3 files must be sampled at 128Kbps to achieve near CD quality audio. At this level, the 64M Nomad could only store slightly more than an hour of music, which is less than a standard audio CD. Drop the sampling rate down any further and the audio quality suffers terribly. Even at 80Kbps, MP3 audio compression becomes painfully obvious to even the most casual listener. At 24Kbps the unit sounds like an AM radio channel with poor reception.

The Nomad really needs more memory before it is useful enough to replace portable CD or cassette players. Priced at \$499, the 32M version is also probably too expensive for casual listeners, although serious music buffs might be interested.

**William Maher**

Distributor	Creative Pacific
Phone	(02) 9906 5577
Online	<a href="http://www.cppl.com.au/">http://www.cppl.com.au/</a>
Price	\$499 for 32M version. \$599 for 64M version.
In short	Promising, but just not enough memory for the price.



## Iomega Klik PC Card Drive

A removable storage solution designed for notebooks and digital cameras, Iomega's Klik PC Card Drive fits into a notebook's Type II PC Card slot. Individual disks capable of holding up to 40M each can then be inserted into the drive, much like a floppy, to store data. Yes, the metal-cased disks are very small and very thin — not much bigger than a matchbox and only about 2mm thick. When not in the drive, the disks must be stored in their hard plastic case and can be password protected.

We did not have any problems installing the Iomega software on a notebook. Windows 95 automatically detected the device and quickly proceeded through installation. Windows assigned the device a drive letter, in our case F:, and after restarting the computer, we were able to use the



drive. The drive is visible in Explorer as a separate drive, just like the floppy drive, and data can be stored, copied, deleted and moved to disks. Files copied extremely quickly, even when copying 20 files at once. The QuikSync software, included with the drive, can be set to automatically update files between the notebook's hard drive and the Klik drive, and it can store numbered versions of documents.

While the Klik PC Card Drive device eliminates the need for any data cables or power cords, notebook users will have one concern about this storage medium — its 40M per disk limit. While this is adequate to store several text or spreadsheet documents, it is hardly suitable for large multimedia files. Expect future generation Klik disks to store a far greater amount of data.

As the Klik PC Card Drive is designed to be automatically detected by both Windows 95 and 98, it can be shared with

other notebooks. One drawback here: the Mac platform is not supported by current Klik products.

As expected, convenience and portability come at a price. The drive and its chrome protective case, plus one disk sells in a box for \$449. Additional disks can be purchased in packets of 10 for \$229.

If you need to store business document backups in case of notebook theft, failure, or for reasons of confidentiality, the Iomega Klik PC Card Drive is an attractive alternative. However, compared to other storage devices, it is lacking in capacity and is quite expensive.

### Roulla Yiaccoumi

<b>Distributor</b>	Iomega
<b>Phone</b>	(02) 9925 7700
<b>Online</b>	<a href="http://www.iomega.com/">http://www.iomega.com/</a>
<b>Price</b>	\$449 for the drive and one disk, \$229 per 10-pack of disks
<b>In short</b>	An expensive storage option, but convenient for business notebook users.

## LifeView LifeTV USB

As we recently reported (see APC, July 1999, page 129), a TV tuner card is a practical and entertaining addition to a PC — but what if you don't have a free slot or you're using a notebook computer? LifeTV USB fills this gap by wrapping the tuner circuitry in a compact and reasonably attractive plastic case connected by a fixed USB cable.

Composite and S-Video inputs are provided, along with a power output for certain cameras. A matching camera — the RoboCam — is expected shortly.

According to the instruction sheet, you install the software from the CD-ROM, plug the LifeTV into the computer's USB port, then plug and play does the rest. Well, yes, but the plug and play part required us to reinsert the LifeTV CD-ROM and then the Windows 98 CD-ROM.

The software picks up the country setting from Windows, but assumes that Australian TV stations broadcast only in the VHF spectrum. Stations were not tuned to their natural numbers (for instance, the Nine Network was on 11). Switching to Austria allowed us to receive UHF channels (such as SBS), but

not VHF channels. With a rooftop antenna, the LifeTV performed at least as well as the best cards in our recent feature, but the supplied telescopic rod was useless. In a strong signal location (in sight of the transmitter), use of the rod resulted in excellent SBS reception, but did not improve other channels — probably due to VHF interference from the test computer.

The unit has a rather tinny internal speaker, so plan on connecting external units either directly or via a soundcard (BYO cable).

The picture in a standard 320 by 240 pixel window was smooth in appearance and motion on the 300MHz Pentium II used in July's tests, but full-screen video was more pixellated and jerky than we remember with any of the internal cards, probably due to the limited bandwidth of USB. Full motion capture gave excellent results at 320 by 240, but we were unable to capture the soundtrack. The distributor's technical support operation was unable to help.

Various minor glitches arose. Pressing the capture button to trigger the image

capture software also turned up the volume; similar fluctuations happened for no obvious reason. Changing channels sometimes muted the sound, which could be restored by reselecting the TV tuner as the video source. Screen captures themselves were excessively cropped along the lower edge and the first capture of a session would be corrupted. We couldn't get the TWAIN driver to work either and once again technical support was unable to help.

Our overall impression was that the hardware is good, but further revision of the software is needed to bring it up to the standard of the internal LifeView tuners.

### Stephen Withers

<b>Distributor</b>	Vision Beyond 2000
<b>Phone</b>	(03) 9558 0333
<b>Online</b>	<a href="http://www.bc.com.au/">http://www.bc.com.au/</a>
<b>Price</b>	\$299
<b>In short</b>	An internal TV card offers better value, but this is a practical alternative for USB-equipped notebooks — subject to battery capacity and software improvements.





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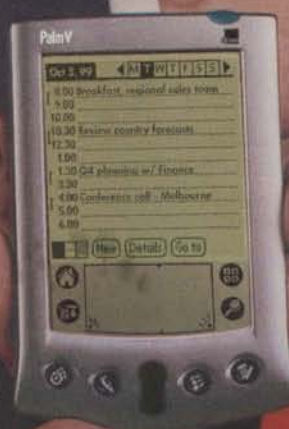
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# Allaire ColdFusion 4

Developers of complex Web sites are all too familiar with the challenges involved in integrating dynamic database-driven content. Allaire's ColdFusion package has earned considerable kudos in this field, even before the release of Version 4. The ColdFusion application server provides database integration functions in an intuitive tag-based system. ColdFusion Markup Language (CFML) tags are very similar to HTML tags, but they are interpreted by the server rather than the browser. The advantage of this is that dynamic content can be generated by the server, without relying on client-side technologies such as browser type or version, JavaScript, Java or plug-ins. Generally speaking, ColdFusion Studio is to ColdFusion what Microsoft InterDev is to Microsoft Active Server Pages.

The updated development environment, ColdFusion Studio 4, introduces a WYSIWYG environment to its already fully featured HTML editing environment. This feature is useful not so much as a design tool, but as a means of providing quick prototyping of Web pages before switching back into regular HTML authoring mode. Unlike most HTML editors, which feature WYSIWYG tools and allow only a minimal amount of code editing support, ColdFusion Studio and its partner, HomeSite, are primarily code editors with simple WYSIWYG support. Other new features of ColdFusion Studio are its ability to perform CFML debugging, as well as HTML and CFML validation. ColdFusion Studio's debugging is quite detailed and allows you to watch variables, set breakpoints, monitor database recordsets and step through the tags as the code executes.

ColdFusion Studio and ColdFusion Server also include some interesting enterprise features. For instance, ColdFusion projects can be managed with full server-side source code control, regardless of the actual location of the files they encompass. Multiple developers can also work on the same project and, by using the new security features, access files and data sources remotely via secure HTTP sessions as if they were on a local network. Additionally, ColdFusion Server now supports new high performance features such as page caching, persistent queries and server load balancing, thus elevating ColdFusion to the level required to service high volume and large user-base Web applications.

Version 4 also introduces scripting support. Anyone who has developed advanced applications in ColdFusion will instantly appreciate this feature. It allows large amounts of code to be grouped into a script (similar to JavaScript or VBScript) but uses CFML tag syntax without the need to break the code into multiple tags.

## ColdFusion versus ASP

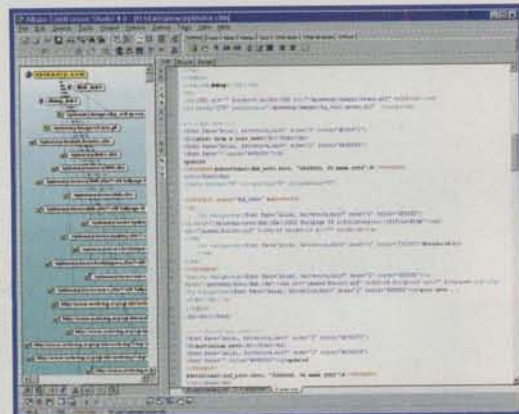
ColdFusion's main competitor is Microsoft's Active Server Pages (ASP) technology. Essentially, both operate as ISAPI filters. When the Web server receives a request for a file with an extension recognised by an ISAPI filter, that page is sent to the filter program for processing prior to its delivery to the browser making the request. Pages with the extension ASP are sent to the Active Server Pages interpreter, and files with the extensions CFM or CFML are sent to the ColdFusion Application before being output to the browser. In the case of ASP pages, however, a certain amount of programming is required to perform tasks that ColdFusion performs transparently. For example, retrieving information from a database in ColdFusion can be done with the following code:

```
<CFQUERY name="myRecordSet"
           datasource="myDatabase">
select * from myTable
</CFQUERY>
```

Performing the same task with ASP, however, is slightly more esoteric:

```
<%
Set Conn=Server.CreateObject
("ADODB.Connection")
Conn.Open("myDatabase")
SQL = "Select * from myTable"
Set myRecordSet = Conn.Execute(SQL)
%>
```

You could be forgiven for concluding that ASP is for the Visual Basic programmer and ColdFusion for the HTML developer. However, it would be a mistake to think that ColdFusion is lightweight in terms of its versatility because it executes tasks such as object creation in the background. Just like ASP, ColdFusion will work with any COM object that exposes the IDispatch interface. Should the standard CFML tags not suit your needs, then



a custom tag or COM object can be created (using C++ for example). It's also worth noting that ColdFusion supports CORBA as well as COM and will run on any Web server that supports ISAPI, NSAPI or CGI on Windows or Solaris platforms.

ColdFusion Application Server retails at \$2,355 for the Professional (4 CPU) version, whereas Active Server Pages is free with Windows NT Server Version 4. The price of the development environments narrows the gap slightly, with ColdFusion Studio 4 shipping at \$718, compared to Microsoft Visual InterDev, which is bundled with the entire Microsoft Visual Studio 6 for \$1,699 (including Visual Basic, Visual C++, Visual J++ and FoxPro). However, neither InterDev or Studio are necessarily required to develop ASP or ColdFusion applications. It is also worth noting that many of ColdFusion's features — such as sending or receiving email — can only be accessed in ASP with the assistance of third-party objects. If you can program these objects yourself, then Visual Studio may be more cost-effective.

Seasoned programmers might prefer to work with ASP and InterDev due to its similarity to other Microsoft development environments. Web developers who increasingly need to move the functionality of their sites out of the browser and onto the server will find ColdFusion extremely appealing. Those requiring a solid, versatile alternative to Microsoft-based environments will struggle to find anything as good as ColdFusion.

**Daniel Potts**



**Distributor**  
**Phone**  
**Online**  
**Price**

Firmware Design  
(02) 4721 7211  
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# Inprise JBuilder 3

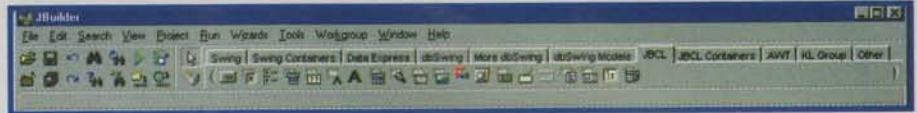
Unless you've been living under a rock, you've probably noticed that the IT industry has a certain preoccupation with buzzwords. At any given time, there is a buzzword *du jour* that's going to solve all of our problems and make us all rich. If you've believed any of these wondrous pronouncements about new technology, that might explain why you've been living under a rock.

A couple of years ago, Java was the king of hype. However, with massive portability problems and obscenely slow performance, it really didn't deliver what the PR promised. Now things have changed a little. With encouragement from Sun, Java implementers have become much better at sticking to standards. Java compilers are getting smarter, while computers keep getting faster. Java's performance is starting to become viable.

Which brings this review to Borland JBuilder 3. This latest offering from Inprise's Borland.com group is a serious player in the Java game. From jazzing up a Web page to developing heavy-duty client/server apps, JBuilder 3 offers something for everyone.

JBuilder 3 implements Java Version 2 using the Java Development Kit (JDK) Version 1.2. It generates stock-standard Java with no custom tags, making your programs portable to any conforming Java environment on any platform. JBuilder 3 comes in three flavours: Standard, Professional and Enterprise.

The Enterprise version is accompanied by more than 300 JavaBean components, ready to create your application. These include the JFC/Swing and JBCL user interface components and a variety of components for database access. Using these components takes much of the work out of building interfaces.



If you're developing database applications, you have a number of choices. JBuilder 3 supports the JDBC API. Based on the X/Open SQL Call Level Interface (CLI), JDBC provides platform-independent connectivity to a variety of databases including Oracle, Sybase, Informix, DB2 and Inprise's own InterBase. In addition to this, the JDBC-ODBC bridge provides connectivity to all ODBC databases. The JDBC Explorer provides a simple way to view and manage databases and JDBC SQL Builder lets you visually design queries. Because the JDBC SQL Builder is a Java program, it accesses the databases using the same JDBC drivers that your programs will use. This should provide consistency in the query results.

If that seems like overkill for your database needs, JBuilder 3 comes with JDataStore. This is a pure Java, embeddable database well suited to making small-footprint, portable database applications.

For fully distributed applications, JBuilder 3 provides extensive support for CORBA, using Inprise's VisiBroker or IONA's OrbixWeb. Using the Application Generator and Data Modeller tools, you can quickly generate CORBA servers and clients and HTML front ends to CORBA servers using servlets. The ORB explorer presents a graphical view of VisiBroker naming services and interface repositories from within JBuilder — making it relatively simple to manage the CORBA services.

JBuilder 3 also delivers some powerful debugging features, including Java 2's new JVMDI debugging API, multi-JDK debugging for applications that use JDK 1.1.5 or later, multiprocess debugging and remote debugging.

The integrated PVCS version manager provides source code control for multideveloper projects, while the Open Tools API allows developers to plug in their own productivity tools.

One of the highlights of JBuilder 3 is the use of Inprise's Two Way Tools philosophy. Wherever a graphical tool generates source code, you can edit the code using the graphical tool or edit the source code directly. Changes are propagated in both directions.

The help system raises a little concern. There's plenty of information, but it's often hard to find exactly what you want. A little more indexing and cross-referencing would certainly be helpful. The technical descriptions have a tendency to assume a lot of prior knowledge that was not always available on the help system. The Java expert won't find that too much of a problem, but the novice will struggle. Perhaps that is a reflection of the philosophy of JBuilder 3 — it's a tool, not a toy.

The proof of any pudding is in the eating and Inprise has provided a perfect testbed for JBuilder 3: JBuilder 3 itself. Eighty percent of the IDE and 100% of many of the tools have been written in Java. How does it stack up? On the whole, pretty well — but there are a couple of problems. As with all Java applications, it's a little sluggish. On your latest high-end Pentium III that will be no problem. If you run the IDE on an older, slower machine it can get a little clunky. Even on very fast machines, the IDE will sometimes pause noticeably. Perhaps it's waiting for the JIT compiler to catch up.

I suspect that we're still one generation short of Java becoming an efficient, general-purpose application development tool — but JBuilder 3 is certainly getting close.

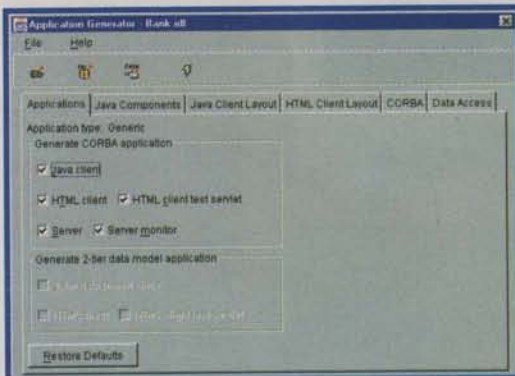
**Michael Smith**

<b>Distributor</b>	Inprise
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<b>In short</b>	Close, so close.

## Highlights and lowlights

Good RAD features  
Good CORBA support  
Two Way Tools  
Plenty of component building blocks

Help could be a *little* better  
Occasional pauses in the IDE







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## Macromedia Flash 4

One of the constraints of HTML is that it's not all that friendly for those with a visual design background. It takes an awful lot of code manipulation for specific item placement and even then, animating layers and adding sounds can be a nightmare. This is where tools such as Macromedia's Flash step in. Instead of working within the confines of HTML, Flash uses its own proprietary format to create flash 'movies', which can be embedded in HTML and viewed with appropriate plug-ins. Flash is now into its fourth incarnation and continues to become more design friendly.

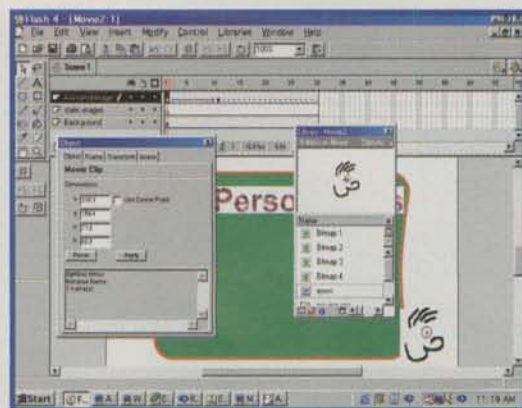
Having your own file format is great — as long as there are enough people out there capable of viewing it. Macromedia obviously has its deal-making hat on, as virtually any recent browser will have been Flash-capable from installation. It's also very easy to embed upgrade messages to push people up to the new Flash 4 plug-in.

Flash is very savvy of the need to compress file sizes. It's no good having an awesome animated movie to sell your products if someone on the other end has to wait while all 4.4M downloads. One of the neatest features of Flash 4 is its ability to re-edit sound files and then embed them as MP3s.

The Flash interface has been considerably upgraded for Version 4; single-click functions are implemented wherever possible. New users may initially be a little overwhelmed by all the options it presents them, but it doesn't take long to appreciate the power of Flash 4. Animation has been made a great deal easier in Flash 4, with simple tweening (interpreted frames between two end frames) creation tools and an intelligent interface that automatically adjusts tweens when objects are moved relative to the movie timeline. Objects can be assigned variables as well as actions, which allows for programming and calculations to be embedded into the final movie, or sent to an external server or script.

Most controls are easy to use, although on the beta version that APC tested, only allowed boxes to be drawn down and to the left for some reason — hopefully this will be fixed in the final release version.

Once a movie is created, it's then a painless process to preview and ultimately publish it. Flash 4 supports multiple file outputs and will create flash movies and supporting HTML code as well as Windows



EXE files if desired. There are also customisable settings for each option. The produced files can be compressed further according to user settings.

**Alex Kidman**

<b>Distributor</b>	Macromedia
<b>Phone</b>	(03) 9853 0900
<b>Online</b>	<a href="http://www.macromedia.com/flash">http://www.macromedia.com/flash</a>
<b>Price</b>	\$569; upgrade \$235; plug-in free
<b>In short</b>	With its easy interface and powerful tool set, Flash 4 is an excellent update.

## Brother MP-21CDX

Printing on the road has always been a difficult proposition; lugging a full printer around is rarely an option. While Canon has had ultra-portable printers available for some time, Brother has now joined in the act.

The Brother MP-21CD is a 1kg, slimline box, that is just 30cm long, 10.6cm high and 5cm deep. It's even more compact if you decide not to carry the sheet tray with you. Doing so, however, means that you'll have to feed sheets manually — an ugly proposition. The sheet feeder does not seem to work well at the best of times, often grabbing three or four sheets and feeding them through as one.

Featuring a strange two-cartridge design — one cartridge contains black and cyan, the other yellow and magenta — it can print at 720 by 720dpi on A4 or letter pages.

It can be connected to a notebook via a special PC Card supplied with the printer. The printer can actually draw all the

required power through this PC Card, obviating the need for an external power supply. Alternatively, a parallel cable (also supplied) can be used, but this requires the connection of an external power supply. Either way, setting up the printer should prove painless.

Connecting via the PC Card might have been a good idea — if it was implemented a few years ago. Right now, a USB connection might be more useful, as USB can also supply power to connected devices. The power drain of the printer is likely to run down your notebook rather quickly, although Brother claims it only sucks up 2.5W of power (as an indication, your CPU probably takes up about four times that amount of power).

Perhaps the biggest bugbear with this printer is its speed. It is *slow*. Printing a basic page of text took one minute and 58 seconds in normal quality mode. And printing in colour? Well, let's just say it's not a good idea. We foolishly decided to

print a full-page colour image at maximum quality. It took in excess of 45 minutes to complete and there were continual timeouts. Clearly, it's not a great option if you want to quickly whip out a colour presentation or two.

Even at the printer's maximum resolution, the print quality was only a shade above dot-matrix and nowhere near the quality of today's consumer inkjets. The colour was particularly bad on plain paper. Obviously, this is not a printer for people with high demands, though in terms of portability, only Canon's portable printers can match it.

**Nathan Taylor**

<b>Distributor</b>	Brother
<b>Phone</b>	(02) 9887 4344
<b>Online</b>	<a href="http://www.brother.com/">http://www.brother.com/</a>
<b>Price</b>	\$649
<b>In short</b>	Useful if you really need a mobile printer. Give it a miss if you don't.





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## MetaCreations Canoma

MetaCreations' Canoma is a 3D-modelling tool designed for the creation of perspective model objects from photographs. It doesn't attempt to be all things to all people and would be most useful for models of buildings and other cube-based objects. It would also be ideal for a really dynamic display of a real estate property or to demonstrate furniture on a Web site.

Unlike a lot of other 3D tools on the market, Canoma stresses the idea of simplicity in all of its aspects. The first step in creating any Canoma model is to import a picture of the desired object. You then overlay wireframes of the most common shapes onto the picture. Canoma doesn't support irregular polygons particularly well, but does excellent work with cubes and triangles. Once a wireframe is selected, it can be 'pinned' to a specific spot on the map, or given a 'bead' to indicate where you think it should go, in cases where a specific axis of a building can't be fully seen. APC tested Canoma with a few stock building photos and some examples from an IKEA catalogue to really test its capabilities with complex objects, especially stacked and irregular objects.

Canoma dynamically renders objects relative to each other, which can often lead to some odd warping effects if you're not careful when placing objects. Objects can be glued together to lessen this effect, as it gives Canoma a better perspective from which to judge exactly what type of object it's trying to represent. Canoma does have the facility to monitor mathematical 'stress' in models to allow you to reduce model warping, although when you first start using the program you'll find your models warping in ways you didn't think were possible.

Once all the models on your chosen image are placed, you can then select a rendering quality and let Canoma map the photo onto the selected polygons. The results can be quite impressive, especially if multiple photos are used to model back views of buildings, objects and so on.

APC didn't have many multiple views and instead used Canoma's texture mirroring facility, which takes textures from the visible sides of objects and does some best-guess mapping onto the hidden sides. This worked fairly well with the building shots we used — after all, most buildings have similar back/front architecture — but produced some truly bizarre



furniture, with multiple glass doors, extra drawers and so on. This is really an area where multiple shots are needed, and Canoma does make it fairly easy to map additional views onto objects.

Created objects can also have an animated camera view added to them via the animation tab. Again, things are kept as simple as possible. You select a starting view and Canoma adds a keyframe. Select the next position and Canoma adds another frame, and automatically sorts out tweening between the two views. Each added frame has a one second duration, although this can be edited by upping the total runtime. It's hard to fault Canoma's animation options, given their overall simplicity.

Objects can be exported in a variety of 3D formats, including MetaCreations' MetaStream format. Animations can be exported as either QuickTime files or as a series of keyframes for animating in other programs.

The interface for Canoma is reasonable and once you get the hang of working in a pseudo-3D environment, model creation is fairly easy. There is a tendency for tools and tooltips to overlap one another, which is irritating when first learning the interface. It's also fairly vital to take multiple photos of desired objects, if only to allow for proper perspective rendering from all angles. Still, Canoma is both powerful and easy to use.

Alex Kidman

**Distributor**  
**Phone**  
**Online**

**Price**  
**In short**

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## Start me up

I just wanted to drop you a line to congratulate you on your start page. I have been using it for about 12 months now and have also set it up as the start page on all PCs on the network. At a glance it gives you access to the most commonly accessed sites that one would not have bookmarked.

**Toni Nossiter**  
Internet

*Ed note: Thanks Toni. For those who don't use <http://apcmag.com/start/> as your home page, do yourself a favour...*

## Bush telegraph

In your Telstra easymail review (see APC June, page 40) an important aspect not mentioned was that many outback people don't have local call access to ISPs. With Telstra easymail, I can now for the first time:

- access and send email for 25 cents instead of a long-distance call (the next ISP is 500km away);
- send or receive mail without waiting five to 12 minutes to log in with my ISP, due to the slow telephone lines from our outdated telephone system;
- avoid ISP costs of 10 to 15 minutes per day (adding up to 72 hours a year) for email only.

For frequent users like me, easymail can save up to \$700 a year on telephone bills and ISP costs. I think this fact is worth mentioning.

**Fred Nuggetman**  
Sandstone, WA

*Ed note: A very good point. Affordable access to email for outback users is definitely one of easymail's redeeming features, though we can't help wishing Telstra would provide rural users with better and cheaper full Internet service instead.*

## Home Linux Home

I am a long-time subscriber to your magazine and have just read the article by Jeremy Horey (see APC June, page 58). In the last sentence of the article, he said

that he is looking forward to the day when he can keep his home network online all the time. That day is already here.

I have a home network of three PCs: mine, my wife's and my daughter's. I have also set up a Linux server on an old PC which was not being used (using your *Linux Pocketbook*) and have a full-time modem connection to the Internet.

Apart from the setup costs, the ongoing cost of this connection is \$20 a month for the phone line (a business line) and \$20 a month for the Internet connection (to Telstra's backbone) which includes 100M of download and 19 cents for each extra megabyte over this monthly limit. There are no time-based charges. The phone stays connected permanently and typically redials (automatically) two or three times per month due to line drop-outs and/or Telstra issues.

Previously, my daughter and I were dialling up once a day and my wife two to three times per day. It was costing over \$30 a month just in phone call charges in addition to the ISP charges of about \$60 a month for the three accounts. It now costs just over \$40 a month and I have the added convenience of a full-time connection and an unlimited number of email accounts. Our family's typical monthly usage is less than 100M a month which I find to be ample for general Web browsing and email (even for three people).

Telstra does not really publicise this facility — I only found out about it through a friend who has it. The Linux server acts as a firewall and an IP router for the client PCs. It can also support file and print sharing through Samba, and Web hosting through Apache. You can even use Telstra's news server and thus have all of the facilities that an ISP would provide. The Linux system, once set up, does not require any administration but the initial setup does require some technical knowledge, especially for DNS.

By the way, the Linux OS is rock solid and has been up for the best part of two months. It does not need to be rebooted every time a configuration change is made. If I could get all the applications available under Windows for Linux, I would change over to Linux for my main machine.

**Martin Imber**  
Caulfield, Vic

## Control stifles innovation?

I work for an organisation which has a large number of networked computers. The IT staff have recently rolled out new hardware running Windows NT, and in order to standardise the desktop interface the rank and file staff are now subject to a stringent 'lockdown'. This effectively prevents the user from running executable files other than those that are centrally administered across the network. The purpose of this letter is to try to highlight some of the concerns and issues that negatively affect users and that should be carefully considered before an organisation implements such a move.

Continued page 42→



## THREADS

from APC's Web sites

Telstra's demonstration of a prototype Net-enabled fridge (see page 20, or visit <http://www.newswire.com.au/9906/fridge.htm>), was quick to stir the imagination of many readers, although not too many of them wanted to put their names to their posts. With comments such as "Now I can tell if the missus has been into the ice-cream during the day when she should be doing the housework", perhaps this is not entirely surprising.

Some thought Net-enabled appliances were a neat idea, but that the prototype design didn't go far enough:

*I want the front of my microwave to be a transparent screen, so when I'm waiting for my food to heat up, I can check my email. Text-based would be fine.*

Many problems were identified with the system. Some wondered about the underlying technology:

*The fridge was using Windows 95 and Internet Explorer. I wonder how many times a day it would need to be rebooted. Imagine going away for a weekend — fridge crashes and you come home to spoiled goods and rotting meat.*

Both Linux and BeOS were proposed as alternatives in this regard. Others foresaw security issues:

*Let's just hope the kid hacker next door doesn't hack into our fridge, find out if we have any cordial/Coke/alcohol, and tell it to unlock the doors so he can come in and get drunk before going home, leaving no trace. Who's going to be game enough to tell their fridge their credit card number?*

Others spied problems with censorship of household appliances:

*It won't work in Australia. Once Net censorship comes in, any command like "Warm up the bedroom" just won't get through. Just think of all the culinary delights that coincide with filtering keywords.*

Want to put across your view, or see what other readers have to say? Join the discussion at <http://apcmag.com/interactive/> and <http://newswire.com.au/sboard/>.

The lockdown is across the board and even staff members with qualifications in computing do not have the benefit of increased access. Only members of the IT department have administrator or advanced-user privileges.

At a personal level, the lockdown has reduced the value of what some of the staff see as part of their package. Taking the laptop home for the kids to load games or run compact discs for school projects was very handy, but if it crashed, the IT staff were expected to fix it, often with a clean re-build for the user to take away and load more junk. Under these circumstances, the lockdown is valid and will save a lot of headaches, but for the advanced user — the enthusiast — who uses the computer on weekends for legitimate research and development, the lockdown has reduced the benefit of the 'perk' to zero.

Some enthusiasts see this as a real reduction in the value of their overall conditions. At my organisation, one employee is anguishing over whether to buy a high-end machine for home use or change jobs; one has already resigned, and in one extreme case, an individual cracked the administrator passwords and was dismissed.

This prompts the question — especially in the case of the cracker — that if users are indeed capable, why lock them down? Why was that individual so frustrated as to crack the system?

I recently attended a developer's conference where much of the documentation was presented on CD. It frustrated and embarrassed me that I was unable to run any executable files that were included. At a professional level it stifles creativity, innovation and spontaneity.

Some bright ideas that have been of considerable value to the organisation first came from deep within the rank and file, sometimes from staff with very little training in IT. Individuals previously had the ability to download programs from the Internet to research and develop their brainwaves before presenting them to their peers. That option is now no longer available. Although the IT department tells us they'll give us what we ask for, some of the ideas that have come to fruition in the past have been so far to the left, that individuals would have had to present a very good argument to get a hearing.

At a corporate level, the stifling effect of the lockdown reduces the ability of the more advanced users to learn and experiment, for example, 'Learn Java'

disks, trial programs that come with magazines or from the Internet, and any executable file simply won't run. Frustrating one's desire to learn and curtailing the freedom to experiment will impoverish the organisation and eventually produce a staff of Luddites by default.

This discourse is not intended as a diatribe against IT departments that are conscientiously struggling with limited resources to meet their obligations, rather, as a cautionary tale for executive management. The lesson seems to be in not letting the situation get to the stage that a restrictive lockdown is implemented with a resultant drop in morale, productivity and professionalism.

**Geoff Phillips**  
Internet

### Internet something provider

Reading through the letter sent in by Bruce Sergeant regarding his frustrating ordeal with OzEmail (see APC July, page 62), I couldn't believe the level of service this person was receiving from an organisation he has faithfully dealt with for over three years.

The quoted price of \$5 a month per megabyte of server space was nothing short of comical. The amount of paperwork this person had to submit and resubmit showed early signs of ensuing trouble. The amount of time this person had to spend on the phone trying to get an answer was incredible. The "horrified" response of the final person Bruce spoke to was all too familiar. The email Bruce received at the end of his 'journey' was also all too familiar.

The response has OzEmail bumbling around the claim to be Australia's leading Internet service provider, while excusing itself from being able to provide a decent level of service to the end user because of "exponential growth" and a doubling of staff numbers.

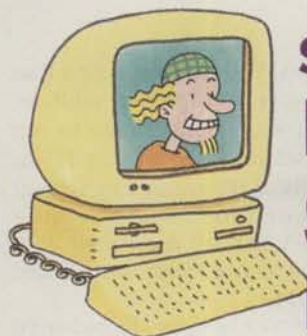
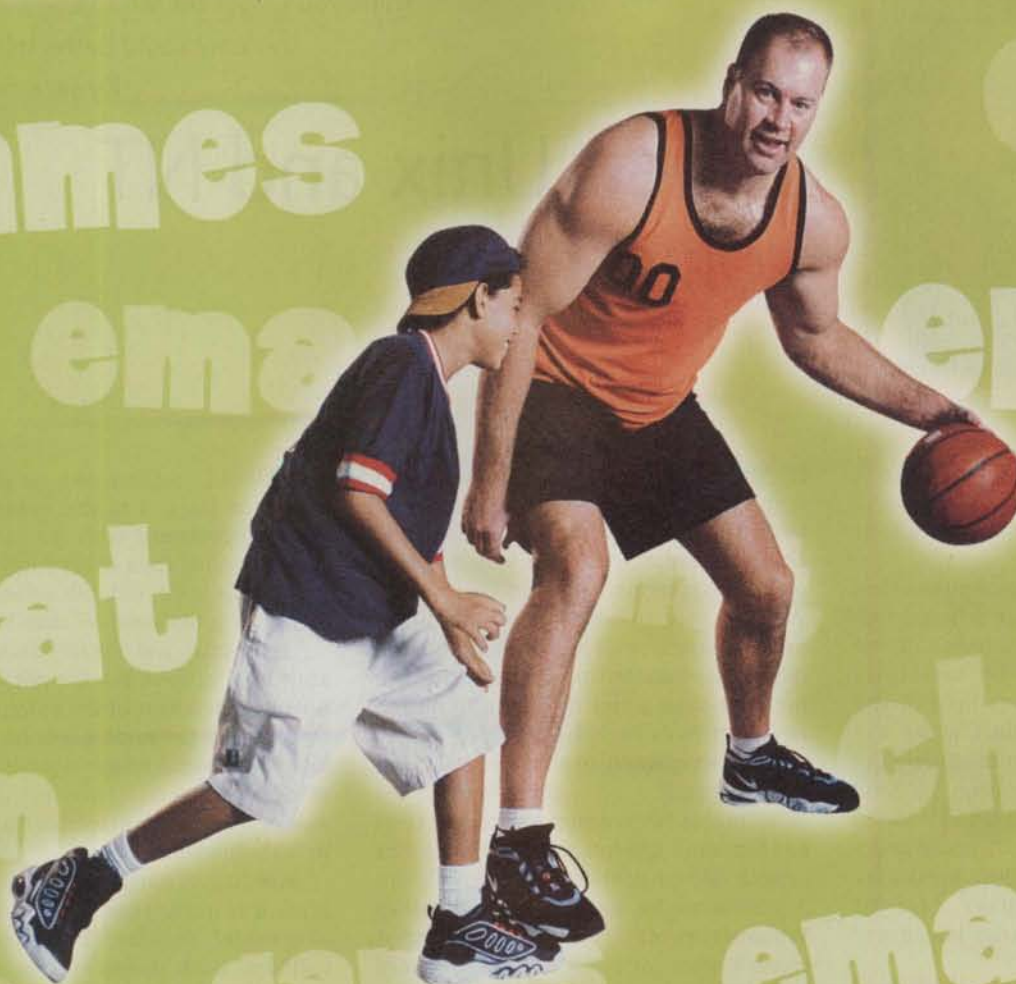
What exactly is the qualifier of being able to claim to be Australia's leading Internet service provider? Total number of users (satisfied or otherwise)? Total number of virtual Web sites? Total number of staff in the customer service and corporate sales teams (experienced or otherwise)?

To some this is all just a 'numbers' game. To others, good old-fashioned service needs to be factored in there somewhere too.

**Gary Meadows**  
Brisbane, Qld



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Think you've got the world's best operating system? You'd better think again.

By Jeremy Horey

## When Unix and NT collide

I am a brave man, or at least I like to think I'm a brave man. To prove it, this month I want to talk about operating systems.

People get upset about operating systems. I remember once when I was editing a publication, I printed an article that contained a quote by somebody from Microsoft that was critical of the Apple Macintosh. I didn't write the article, but I was almost immediately the target of an email campaign by Mac enthusiasts. My name and email address were posted on a Mac newsgroup and I received more than 1,000 messages complaining about the piece. Most of these came from people who had never even read the article.

Although this was a pain while it lasted, it was not a serious matter. But it illustrates the strength of some people's feelings about operating systems. I have never understood this. I really don't think that any of them are so good that they deserve my absolute loyalty. I can find things to like and things to hate in every operating system.

Developing an operating system involves making trade-offs between different priorities. Because most of the companies that make operating systems are in the business of making money, those compromises are not always in the best interests of their customers. So we should not be surprised to find all sorts of compromises that we don't like in every operating system. And while it is true that some operating systems are better for some tasks than others, it is also true that no matter what some zealot may tell you, no single operating system is the best for every sort of application.

We use computers in many different ways. It is fantasy to think that it is even possible to build an operating system that is going to suit all applications (as APC's review of desktop OSes last month emphasised).

Now that I have that off my chest, I want to talk about Windows NT and Unix. Luckily companies are not forced to choose between these two very different operating systems. They can coexist very well. But they do have different strengths and weaknesses. If we understand the differences between them, we can make better choices when it is time to design new systems or consider which operating systems we should use as we redevelop old systems.

Windows NT is easier to use and costs less for small systems than Unix. NT has simple administration tools, which are easy to access for users familiar with other Windows operating systems. Setting up a server system for a few users is also very

like Alphas, but it is not as scalable or robust as Unix. You are going to have ongoing problems with NT in any area that demands high availability. You can craft large-scale reliable solutions from NT, but it is not what NT does best.

In contrast, you can use Unix in small-scale applications, but it is not what Unix does best. It is best at the enterprise level. Of course in the middle ground there is a lot of crossover. And this is generating a lot of heat between Microsoft and Unix vendors. There are all sorts of claims flying in both directions.

Making a decision in this middle ground is hard. There are lots of factors to consider. But don't be blinded by the vendors. Both operating systems have

**It is true that NT allows clustering and can run on high-performance processors like Alphas, but it is not as scalable or robust as Unix.**

inexpensive. A PC with NT would certainly cost less than \$5,000. Yes, you could set up a Unix system for less, especially if you used Linux. But you will end up spending a lot more time sorting out applications and networking than you would with NT. NT expertise is easy to find; there are a lot more people training to set up NT machines.

At the other end of the scale is where Unix shines. If you want a large-scale, reliable and cost-effective system to serve hundreds or thousands of users, then Unix is a great solution. If you are at this end of the scale, you will have the expertise to set up and manage Unix, or at least you won't have any qualms about hiring the right people.

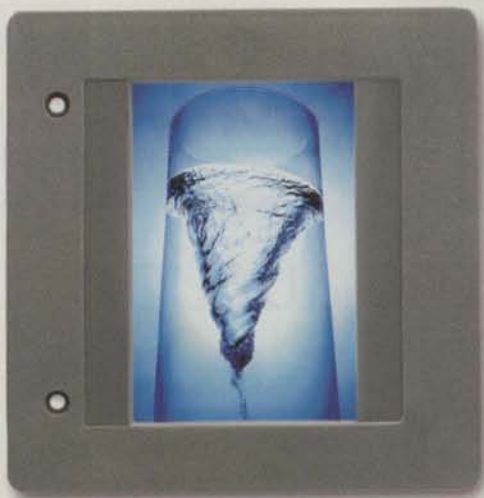
It is true that NT allows clustering and can run on high-performance processors

their own roles. You may even find that a blend will give you the best solution. For example, you might choose to run your databases on Unix but use NT as your Web server. You can run several Web servers and load share between them, but they can all draw their data from a single source, your Unix-based database server.

It would be nice to leave the bickering about which is the best operating system to the vendors, but people — especially experts — can be very one-eyed. To make the right choice, you need to keep both eyes open.

Jeremy Horey is a senior consultant with Tech Talk Australia, a division of Com Tech Online. He can be contacted at [jeremyh@techtalk.com.au](mailto:jeremyh@techtalk.com.au).





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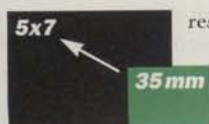
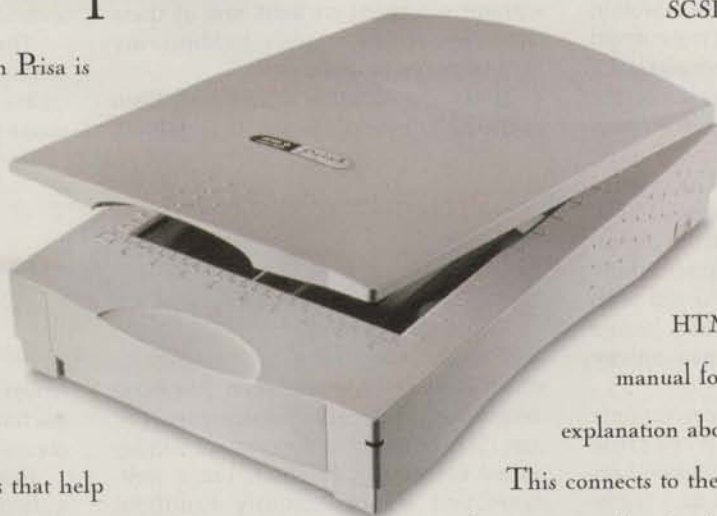
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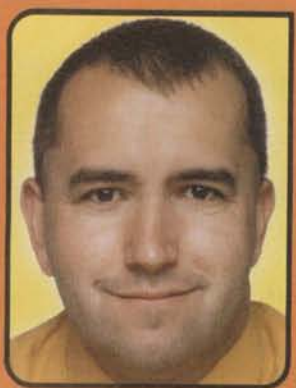


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Online auctions are all the rage, but there's still an annoying physical element.

By Angus Kidman

## Piece of the auction

The second I saw the set of three Bananarama picture discs, I knew I had to have them. A surprisingly large amount of my storage space is already taken up with vinyl obscurities and rarities from a wide range of early '80s bands, and I could picture the faces of Bananarama's three members — Keren, Sara and Siobhan — staring out at me from one of the few vacant spots of wall in the lounge room. Sure, I might not ever get round to actually playing the vinyl, but I'd be able to stare at them, basking in the dubious glories of a time when too much mouse was barely enough.

OK, confession time. The visual metaphors above are complete lies. I 'saw' the Bananarama picture discs on an online auction site, and immediately, almost thoughtlessly, made a bid with only the vaguest idea of what they looked like. (The desire to hang them on my lounge room wall was real.)

Purchasing goods sight unseen (or only seen in a badly scanned JPEG) is one of the risks associated with hanging around an online auction. However, this isn't really more of a problem than buying something at a real world auction house where you only get to inspect the goods in a cursory fashion while being jostled by numerous other bargain hunters. Willingness to embrace a potential dud in return for massive savings is a central plank of auctions in any form. The fundamental problem with online auctions is a little more complicated than that.

Before you run to the hills screaming and assume that this is yet another one of those hyper-reactionary columns that damns all forms of Internet commerce as a waste of time, a huge security risk and a dramatic invasion of your privacy to boot, let me make one thing clear: I love online auctions. I'm totally addicted. I let my fingers do the walking... on my keyboard. I want my eBay. I whined when the company had a day-long outage in June.

To meet this insatiable desire, I have accounts at eBay (the brand leader), and Yahoo (good because the listings are free and they do Australian currency), and Amazon.com (because I buy books from them anyway). I also have accounts with the more recently launched Australia-only auction sites Stuff Auctions, Sold.com.au and IBuy. I find it hard to let a day go past without searching at least one of these sites, and if I'm actively bidding, my browser might never leave.

So far, my activities have mostly been restricted to buying, rather than selling,

for a money order, and then send it off in the post. This is not instant satisfaction. It certainly doesn't compare to the joys of buying from a standard online store.

This isn't always a problem. eBay in particular hosts an increasing number of online-only stores that offer credit card payment as an option. But, the real bargains (and obscurities) tend to be offered by individuals, leaving me no real alternative.

There's clearly a gap in the market here. Anyone willing to offer a decent online funds exchange service stands to make a mint from suckers like me. Indeed,

Willingness to embrace a potential dud in return for massive savings is a central plank of auctions in any form.

which is what happens when you have overdeveloped hoarding tendencies. I'm sure I'll get around to flogging something online eventually. In short, I'm a well-developed if not actually fanatical supporter of online auction sites. And that's why I wish they were better.

My initial problem was the highly US-centric nature of the listings. Getting a bargain CD for \$5 doesn't look so good when you factor in the exchange rate and an obscene postal bill. This problem has eased somewhat since the introduction of the Australia-specific sites mentioned above. Most of the stuff I tend to want still seems to originate from overseas, but I now have the option of restricting myself to stuff I can expect to see inside a fortnight.

What I don't have is the option to complete the entire transaction online. I can select the goods I want, bid for them, and learn the outcome of my bid with nothing more than an IP connection. But because I'm largely bidding on goods sold by individuals, I then have to take myself to the nearest post office, queue and pay

whoever developed it could sell it to all the auction sites and profit regardless of who comes out on top.

Ideally, such a system would automatically charge the funds to my credit card, convert them to another currency if necessary, then transfer them to a nominated seller. The seller wouldn't see my credit card details, so I'd be secure, but they'd be able to complete the sale straight away.

I realise that early attempts at ecash worked in a similar fashion, but these were always doomed to failure because they required the use of unfamiliar currencies and mechanisms. Credit cards are now an established means of exchange online, though, and hopefully no-one's stressing insanely over the security of this anymore. I wait with bated breath for someone to raise a fortune on Nasdaq promoting this concept.

Angus Kidman is APC's deputy editor and editor of the Newswire service. He can be contacted at [akidman@acp.com.au](mailto:akidman@acp.com.au).





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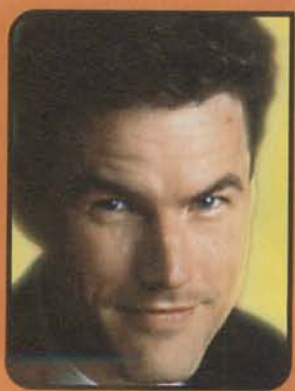
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Technology is providing new means of invading our privacy — but are we overreacting to some of the problems created?

By Bruce McCabe

## You've got junk mail

Protecting our privacy has become a complex issue. We now worry about government abuse of power and misuse (or misappropriation) of personal information. We also worry about abuses from businesses or individuals within those businesses. Then there is the danger of criminals obtaining information that can help target their activity. If a thief can cross-reference names and addresses with electronic purchases, bank balances, or car registrations, it makes stealing a whole lot easier.

We all recognise the basic need to protect personal information and the inability to safeguard our private details is evidenced on a daily basis. We often find our names, addresses and other details used for targeted marketing. When we specifically request ongoing information from a supplier about their products we consider it a service; any other time it is a nuisance. Nevertheless, targeted marketing is a fact of life.

Information technology is, of course, the great enabler of both the use and abuse of personal information. More records containing personal information are being created on more databases and commercial organisations are mining them more effectively. They are running more focused marketing campaigns with better returns on their investment. Cross-referencing is much more common, as is the practice of selling or renting databases to make additional revenues.

The Web has become an incredibly efficient way to collect and distribute personal information, particularly as we sign up for more online products and services. Likewise, email now provides a communications mechanism faster and more direct than any that has preceded it.

So in addition to the junk mail in our letterboxes, most of us now have to cope with similar material on our desktops. I receive unsolicited email or have my address placed on new mailing lists once

every two to three days, which is particularly annoying when I do most of my work remotely and am constantly trying to minimise the amount of traffic on my dialup connection.

On the other hand, if I have to live with direct marketing then there are real pluses to the electronic version; no trees are killed, unwanted email can be deleted with a keystroke, and software can be used to automatically delete all future emails from the same source.

For all these reasons, it is necessary to approach any technology that facilitates the collection of personal information with a healthy degree of suspicion. But it

default state. Intel's main goal, however, was to add more value to its product (and thus increase demand) by providing built-in authentication technology, which could be used by IT managers to improve security on networks, intranets or extranets, and to help improve security in ecommerce applications for all users. Intel was certainly guilty of underestimating the public reaction, but it was taking (and continues to take) a commendable interest in improving the security of the PC platform through hardware-based enhancements.

In the case of Office 2000, consumer concerns centre around the possibility Microsoft could misuse information

Information technology is, of course, the great enabler of both the use and abuse of personal information.

is a bit more complicated than that because some developments perceived as threatening are actually crucial to deliver the full potential of information technology into society.

Two technology announcements this year, both of which received considerable attention in relation to the issue of privacy, illustrate my point. The first of these was Intel's processor serial number, or PSN, which was introduced with the Pentium III product line. The second announcement was the introduction of 'locking' technology to Microsoft's Office 2000, requiring user registration to receive an unlock code. Both warrant close scrutiny because they have the potential to affect almost every PC user.

In the case of the PSN, the idea of a unique identifier that might, for example, be used to track an individual's activity on the Web, horrified privacy advocates. Consumer pressure forced vendors to deliver PCs with the feature switched off as the

collected in the registration process. Microsoft's key objective, however, is simply to cut down on piracy of its products, which has a significant upside for the consumer. We regularly complain that software prices are too high, and software companies frequently use the high rate of piracy as justification. If locking technology can successfully make a dent in piracy, then the argument disappears and consumers stand to benefit the most.

Safeguarding our privacy requires a healthy degree of paranoia and severe penalties for the misuse of personal information. Equally important, however, as we move into an information-centred society, is keeping our minds open to the leverage of personal information for our own benefit.

Bruce McCabe is research director at Gartner Group Australia. He can be contacted care of [apc@apc.com.au](mailto:apc@apc.com.au).





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## 1440 DPI, Drop Modulation Technology and Individual Ink Tanks.

If you demand speed, quality and economy from your printer, look no further than the new Canon BJC™-6000.

**New see-through ink tanks.** What really distinguishes the BJC-6000 is the new ink tank system. For better operating economy there are individual see-through ink tanks for all colours. Each is separate from the print heads, significantly reducing operating costs and allowing you to replace only the empty tank.

**The think tank system.** Each ink tank has a prism moulded into the bottom. A beam of light measures ink status, and a monitor in the printer driver keeps users up to date on the amount of ink remaining in each cartridge.

**More life-like colour.** An all-new driver emphasises colours as they are perceived by the human eye. The result is natural colours with more subtle variations in dark shaded regions, and better gradations in high-lighted areas. PhotoRealism with a six-colour ink system and Drop Modulation further enhance quality, even on plain paper.

**1440 X 720 dpi.** Drop Modulation Technology™ generates droplets around one-third the size of conventional

droplets giving you high resolution printing at 1440 X 720 dpi. The result is a sharper image with smoother tonal gradations.

**Sharper Black Text.** Drop Modulation Technology is now available for the first time with a black cartridge to help eliminate grain in text. At the same time newly developed black ink gives sharper, clearer text with improved water resistance.

**New, high-performance engine.** An innovative new engine design provides the fastest print speeds, in both black & white and colour, of any Canon Bubble Jet printer.

**Canon Customer Care.** All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are

available for Windows® 95/98/NT and an optional USB conversion kit is available with drivers for Windows 98, iMac and Mac G3.

If you are looking for performance and economy, you've found it in the new BJC-6000. For more information please call us on 1 800 021 167.



**USB**



**New BJC-6000 - \$549<sup>RRP</sup>**

**Canon**

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Can you save money on a  
PC Card modem?

# Hook up that notebook

A relatively recent innovation in notebook design has been the inclusion of built-in modems to leave PC Card sockets free. However, other alternatives remain for users of older notebooks, or those with a slower built-in modem. It is feasible to connect an external PC modem, as long as you have a spare serial port. This approach has advantages if your funds are limited, as even external PC modems tend to be cheaper than their notebook equivalents. The downside is that whacking a large PC device onto your notebook limits portability. A more preferable option is a PC Card modem.

Before diving into a PC Card modem purchase, it's definitely worth checking a few details relating to the modem and notebook. A lot of individual notebook models (especially older machines) can have quirky problems with specific modems or modem drivers, so it's often worthwhile to contact your notebook manufacturer to see if there are any known problems with the type of modem you're considering.

Unlike desktop machines, your average notebook isn't upgradable and tends to contain a large amount of custom hardware. Taking a host of specific device drivers and introducing a modem driver into the mix can often be a painful experience. Doing the checking first can

save an awful lot of running around between modem suppliers and hardware suppliers, not to mention averting an awful lot of frustration.

You should also check with the modem manufacturer about their policy on external dongles. Most PC Card modems look just like other PC Card cards — credit card-sized chunks of plastic. Unfortunately, there isn't (yet) a way to insert a credit card into a standard phone interface, and this is where a dongle comes in: to form an adaptor interface for a standard phone cable. Dongles are notorious for becoming lost or broken and they can be quite expensive to replace. There are dongle-free alternatives, such as Xircom's RealPort (reviewed in APC September 1998, page 36), but unless you also need a network card, you'll pay more for one of these.

Most of the standard 'names' in modems also supply PC Card versions, so the usual NetComms, 3Coms and so on proliferate in the market. There are smaller manufacturers, but given the small size of the market (and the relatively high cost of the modems) these are probably best avoided. You should also check BIOS flash options, with V.90 compatibility a virtual prerequisite. Another factor to investigate is GSM compatibility, which allows for connection between digital mobiles and modem cards.

## About Price Watch

Each month, Price Watch examines variations in retail pricing and service. Investigations are conducted anonymously, either by telephone contact with retailers or through pricing details supplied on their Web sites. Prices and specifications provided here are as quoted by retailers; while we assume these are correct, we cannot accept any responsibility for errors and omissions. The responsibility rests with sales staff to provide adequate information, as their employer would expect them to do with every customer. Readers are advised to always obtain a written quotation prior to making any major technology purchase.

As can be seen from the table below, there's not an awful lot of variation between vendors and the 56K Banksia/NetComm modem dominates the market. You can expect to pay about \$270 for one of these, give or take a dollar or two. If you're on a penny-pinching budget, you could look to a 33.6K modem, although these are becoming rare at the retail level. None of the vendors Price Watch contacted offered any type of 33.6K modem, so you might want to try second-hand or smaller retailers.

## PC Card modems

Retailer	Contact	Product	Price
Adelong Computers	(02) 8344 3190 <a href="http://www.adelong.com.au/">http://www.adelong.com.au/</a>	NetComm CardModem56 PC Card data/fax modem	\$275
Altima Computers	(02) 9755 7835 <a href="http://www.altimaco.com.au/">http://www.altimaco.com.au/</a>	3Com Megahertz 56K Global Modem PC Card	\$299
Bozzo Brown's Computer Warehouse	1800 061 486 <a href="http://www.bozzo.com.au/">http://www.bozzo.com.au/</a>	Banksia ComboCard 56 PC Card modem and network card	\$290
Cydex	(02) 9411 5088 <a href="http://www.cydex.com.au/">http://www.cydex.com.au/</a>	AusLinux ABC PC Card 56K fax/modem	\$181
Forte Computers	1300 368 922 <a href="http://www.fortecomputers.com.au/">http://www.fortecomputers.com.au/</a>	Banksia ComboCard 56 PC Card modem and network card	\$270
I.Store	(02) 9558 9288 <a href="http://www.istore.com.au/">http://www.istore.com.au/</a>	3Com Megahertz 56K Global Modem PC Card	\$310
PAW Products	1800 677 729 <a href="http://www.paw.com.au/">http://www.paw.com.au/</a>	NetComm CardModem56 PC Card data/fax modem	\$265
Pioneer Computers	<a href="http://www.pioneercomputers.com.au/">http://www.pioneercomputers.com.au/</a>	NetComm CardModem56 Combo (PC Card data/fax modem and 10BaseT/2 network card)	\$315
TEG computers	<a href="http://www.tegcom.com.au/">http://www.tegcom.com.au/</a>	NetComm CardModem56 PC Card data/fax modem	\$277
		Banksia 56K PC Card modem	\$252
		Banksia 56K PC Card modem	\$260



**1440 dpi**  
up to A3.  
ESS · STOP PRESS · STOP PRESS · STO

# 1440 DPI, PhotoRealism, richer blacks, exceptional speed, plus independent cartridges.

The idea of a dual cartridge system has existed for awhile. But needless to say, some systems are better than others. The new BJC™-5000 proves this point.

**1440 dpi with variable ink drop sizes.** Both the standard colour and optional PhotoRealism™ cartridges use Canon's Drop Modulation Technology™ with variable drop sizes in resolution up to 1440 dpi. The combination delivers smoother colour gradations and far less "grain" on virtually all paper types.

**New dual-cartridge system enhances performance.** Then, a special dual cartridge system lets both cartridges act independently to complement each other. In "split-page mode" identical black or colour cartridges can effectively double print speeds. Or, using different ink types you can produce exceptional quality effects, with the printer automatically identifying and using each cartridge for the desired result.

**90 times more colour combinations.** For instance, PhotoRealism inks can be used with conventional inks for a seven-colour ink system, with multiple ink densities per pixel for up to 90 times the colour combin-

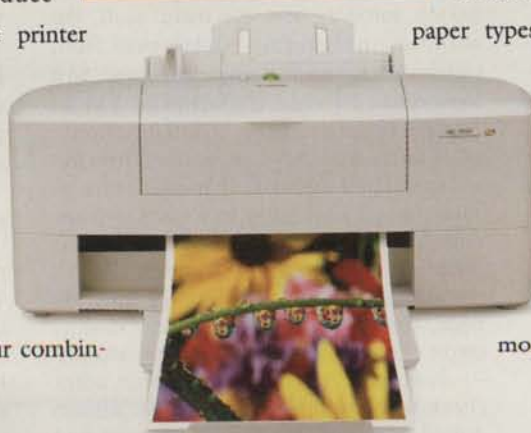
ations of conventional CMYK inks. Combined with Drop Modulation Technology the result approaches silver halide quality reproduction.

**An all-new approach to black.** It uses new, black ink that is blacker than conventional ink. As a result, black & white documents have an exceptionally high degree of finish. Two of these cartridges (BC-23) are included in the box, and may be used simultaneously.

**Superior Photographic Reproduction**  
The BJC-5000 combines several technologies designed to give you advanced photographic reproduction. There is resolution up to 1440 dpi, dual drop sizes produced by Drop Modulation Technology, and PhotoRealism featuring multiple colour ink densities for layered colours using a seven-colour system. The results are stunningly obvious. Gradations are smoother. Light tones such as off-whites and skin tones show virtually no visible grain. Dark tones are richer. Blacks are more subtle than different black ink.

**Independent print heads can halve print time.**

**Professional Resolution  
Ultra-High Definition.**



**Print up to A3.** Both standard and PhotoRealism inks may be used on all A4 paper types. It will also print up to A3, and supports banner printing to the equivalent length of 6 A4 pages.

**Canon Customer Care.** All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by unlimited hot-line support. To learn more call us on 1 800 021 167.



**New BJC-5000 – \$599<sup>RRP</sup> including 3 cartridges.**

**Canon**



It seems many APC readers have been burnt as a result of using a credit card to purchase goods online. **By Roulla Yiacoumi**

# Don't visit the Web without it

**T**he story of Harry's porn-surfing activities gone wrong (June APC, page 66) brought a flood of letters from APC readers.

You told us you had been billed for goods you did not order and porn services you did not request, and some of you were inexplicably billed multiple times. Some of you had success in reversing the charges through your bank, while others are still awaiting an outcome. A considerable number of you were too embarrassed to report the incident.

Here is a sample of the feedback we received. At the request of the writers, we have removed the names from these letters.

## Letter 1

"I was surfing a US porn site one night and the site said it needed a credit card number which was not to be billed; it was required only for verification purposes. I entered my details. On my next credit card statement, I was shocked to see the charge of \$70.92, converted from \$US44.95. I didn't tell the bank, but one thing that I will not do is surf porn sites again."

## Letter 2

"I have been ripped off by at least two adult sites. I discovered the problem on my credit card statement when I saw three charges in a row from the same company. This had me curious and I informed my bank. The charge was re-credited.

Thousands upon thousands of these transactions must occur daily on the Net. You might look at your statement and say 'Ah well, it's only \$4.95, why bother with it?'. Multiply that by 1,000, and you have a big money maker, which plays on people's apathy. My theory is some shonks may try to get away with charging you twice or more, hoping on the off-chance you will not even bother to complain as you may be too embarrassed to, or that you may not even notice the charge in the first place.

Another trick of such sites is to re-bill you when your subscription period ends. I have seen some sites advertise this as 'convenient to you, the customer' but it is far more convenient to the company. If you were not aware of this automatic charge clause, you cannot get a refund!"



## Letter 3

"We had a similar experience with these porn sites. I once used my credit card to buy a composting and recycling journal in 1998. A few months ago, charges from various suppliers who obviously belong to the porn industry appeared on my credit card. I have asked my bank to investigate — at this stage without success."

## Letter 4

"I use my credit card probably every few months on the Internet for books, CDs, tickets, software and the usual stuff, but without any trouble whatsoever from purchases I had initiated. However, last November I found a charge of \$31.33 appear, converted from \$US19.95, from a US company. As I use the Internet extensively I almost dismissed this as something I had forgotten, but I became curious and searched for a little while against the name of the company until I stumbled across their Web site. On the front page, there was a small button 'Strange credit charges appearing on your account — click here'. This redirected to an adult check with a whole range of disclaimers aimed at people who they assumed had registered with their credit card number and now wanted to cancel. I printed out the critical pages and called in to my bank to make a fraudulent card charge complaint.

Now I expected some hassle at the bank but there was nothing of the kind. The charge on my card was cancelled. I suspect the banks have something to hide about the volume of fraud that is around."

## Letter 5

"Recently I noticed a line on my Visa statement debiting \$US12.90 to an adult verification site. In fact I had been getting a similar debit for several months, but although there was a niggling doubt I just shrugged it off as being a magazine subscription or something. It was only when I tried to trace what it was, via the Internet, that I discovered what it was. I have no interest in adult sites, and have only rarely given out my Visa card over the Internet. I fail to see how one can give out Visa details by mistake!"

## Letter 6

"I wondered what investigation goes on in relation to credit card fraud and if anyone ever gets nailed for using card numbers illegally? I had four unauthorised transactions on my MasterCard in 12 months. I had only ever used it online once, back in 1996 with a reputable Australian firm to register a copy of software. All the suspect transactions were from US Internet-based companies, totalling \$US100. The last two were within four days on the same bill and really got me furious, but the bank never tells you anything about who, how or why this happens. I suppose I should be thankful that they always re-credit the amount. But I worry if they still put it down as a black mark against my account and wonder how many suspect transactions they would foot before saying 'no more'.

I now have a new MasterCard number and there is no way in the World Wide Web that I'm going to let it loose again."

**Have you ever noticed any unexplained charges on your credit card statement? Have you tried to contact the company that billed you? Have you notified your bank? Email me at [ry@acp.com.au](mailto:ry@acp.com.au) or write to Service & Reliability, APC, Level 8, 54 Park St, Sydney, NSW 1028.**



Australia's most popular printer for home and small offices combines exceptional value, with outstanding performance.

Use 75% less ink. Super Economy mode reduces ink consumption by 75% compared to Standard mode, and works for both black and white and colour. Combined with an optional high capacity, black ink cartridge, it can print up to 2400 pages in black and white, and up to 400 in colour using standard inks\*. That's anywhere from two to five times the output of any direct competitor!

**Photo quality printing.** There are three colour print modes – Normal, Fine and Photo. Photo mode emphasises highlights and contrasts, and improves half-tones by producing richer blacks. Or, using the optional black ink cartridge, you can convert the BJC™-265SP to a fast B&W printer.



Brilliant colour, super economy, optional PhotoRealism, better Internet printing,

# all for just \$169.

**Optional PhotoRealism™** To this Canon adds the option of PhotoRealism inks, for photographic reproduction approaching silver halide quality. It produces up to four times the colour combinations of conventional CMY printers, for smoother colour gradations and more accurate colours in skin tones and other light shades.

**Better Internet images.** Image Optimisation takes low resolution Internet images (typically 72 dpi), and prints them at the highest resolution supported by the printer to reduce jagged edges and pixelisation.

**Canon Customer Care.** All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support.

Drivers are available for Windows® 3.1x/95/98 and Windows NT.

The BJC-265SP offers exceptional operating economy plus high quality colour printing, for just \$169. For more information call 1 800 021 167.



**BJC-265SP colour Bubble Jet™ printer – \$169<sup>RRP</sup>**

## Canon

\* Based on 5% page coverage for B&W and 7.5% coverage for colour, Super Economy not available with PhotoRealism inks. Price shown is the recommended retail price including tax. Canon and the Canon logo are registered trademarks and BJC, Bubble Jet and PhotoRealism are trademarks of Canon Inc. Windows is a trademark of Microsoft Corp. in the U.S. and other countries. Canon Australia Pty Ltd, ACN 005 002 951.

CS6412



After some false starts, application rental solutions seem poised to take off.

## Why buy when you can rent?

The concept of renting equipment rather than purchasing it is a familiar one to most businesses, and the potential cost savings are widely recognised. But can the same logic be applied to software?

Outsourcing an entire IT infrastructure is a popular notion with large companies (see APC July, page 66), but the idea of using the same approach with software alone hasn't been widely explored. However, with the ever-increasing use of the Internet to provide wide area networking to businesses of all sizes, the notion that applications might be accessed from a central server for a rental fee, rather than purchased outright and installed on a local system, is becoming more popular. Perceived advantages of this model include the ease of upgrading and the fact that support is centralised in a single location. This focus on both service and software has led to services being provided by companies which are commonly referred to as application service providers (ASPs).

Although it is yet to come close to rivalling conventional software licensing systems, ASP (not to be confused with Microsoft's Web serving technology of the same initials) is gaining momentum in Australia. In June, it moved a step closer to the mass market, announcing that several leading IT companies, including a number of Australian developers, have pledged their support for a new industry body designed to promote the concept. The ASP Industry Consortium has already managed to secure the support of a number of major Australian and international companies. The group now has more than 50 members including Microsoft, Cisco, Sun, IBM and Compaq.

Proponents claim ASP can provide massive cost savings for companies that no longer need to purchase their own software or maintain their own hardware. "We intend to do for applications what the Internet did for data," said consortium chairperson Traver Gruen-Kennedy.

The concept has already become popular with several Australian companies, including accounting software firm Solution 6. Earlier this month, the company announced it has begun an ASP pilot program with UNICEF

Australia. Under the deal, Solution 6 will provide SAP's R/3 suite over the Internet to UNICEF in return for a regular rental fee.

The trial, expected to be fully operational by early August, will enable UNICEF workers in Sydney and Adelaide to access accounting applications remotely. Solution 6 will provide online access to a company intranet, messaging tools, customer databases and accounting applications.



Solution 6 has already signed a deal to deliver SAP's finance tools over the Internet, and has indicated online access will eventually be extended to Solution 6's own products. "Delivery of our own applications over [the Internet] will form a major part of Solutions 6's long-term strategy," said marketing manager Richard McLean.

Solution 6 has also been searching for suitable companies to provide the back end infrastructure for ASP services. Among these are several network providers that have recently expanded their operations in the Asia-Pacific region. ServiceNet is one example, having recently opened a data centre in the Sydney CBD.

Another company to firm up ASP plans is Citrix, which has struck a deal with Cisco to develop network routers optimised for thin client applications. Citrix hopes the resulting performance standards will provide a kick-start to the emergence of ASP companies planning to use Citrix products.

As well as Solution 6, other local companies have also joined the ASP Industry Consortium, including Mincom, MUA and Professional Advantage. Consortium members predict that more local vendors will follow, but admit the ASP market is still in its infancy. "The market is going to explode. The thing we will have difficulty predicting is when that will occur," said general manager of Solution 6's ASP division Kent Duston.

One major hurdle confronting the group is to persuade major software vendors to provide ASP licences for new software releases. Duston and Citrix spokesperson Phil Osborne both admit that the licensing issue needs to be considered, although consortium chairperson Gruen-Kennedy claims the issue doesn't pose a problem. "What I think software vendors need to do is to understand the upside [of ASP]. It doesn't necessarily mean their revenue goes down," he said.

Despite the show of public confidence, other vendors indicated that more support was needed before ASP could take off. Cisco spokesperson Liz Lawson said she was "surprised" that many of Cisco's competitors had not joined the consortium. "It's a new concept. It's going to take a while for people to wrap their heads around it," she said.

Perhaps the biggest opportunities are to be found in the thin client market, where companies like Citrix are enjoying renewed interest from corporate customers. Citrix has already incorporated billing capabilities into its new software releases and has secured several major ASP projects. In the past six months the company has had talks with local carriers Telstra and Optus about the possibility of ASP, although details of concrete plans have yet to emerge.

Despite the major role Citrix has played in the ASP Industry Consortium, chairperson Gruen-Kennedy has moved to reassure members that "this is not a club dominated by any single company". Several other thin client companies have also joined the consortium, including terminal emulation company Wyse Technology.

**William Maher**



# An incredible list of features, at a stunning new price, in a full sized printer.

Drop Modulation  
Technology™

Optional scanner

PhotoRealism™

Super fast blacks

It can cut ink consumption by 75%, be used as a scanner, improve printed images down-loaded from the Internet, or even print banners. And this is in addition to better colour for plain paper, PhotoRealism inks for the gold standard in photo quality printing, plus super fast B&W!

**Better operating economy.** Super Economy mode reduces ink consumption by 75% compared to Standard mode, and works in both black and white and colour. It can print up to 3600 pages in black and white, and up to 400 in colour!

**Better on plain paper.** Another feature is Canon's Drop Modulation Technology with dual drop sizes for smoother colour gradations. It is designed to produce better looking colour on plain paper, which also helps keep operating costs down.

**The PhotoRealism gold standard.** When quality is most important, there is the option of Canon PhotoRealism inks. They vary the saturation per pixel so that a single dot could have 0%,

33%, 67% or 100%. This produces up to five times as many colour combinations as conventional CMYK inks, with better half-tones and almost no visible grain, even in areas of low colour density.

Super Economy  
in colour and B&W

**High speed blacks.** A high-speed black ink cartridge with 128 print nozzles is included with your purchase.

It is capable of speeds up to 510 characters per second (4.5PPM).<sup>2</sup>

**It's even a scanner.** The optional IS-22 scan head allows you to turn your printer into a colour scanner in seconds. It scans colour images up to 360 dpi and offers high speed B&W scanning for fax, OCR and copying functions.<sup>3</sup>

**Canon Customer Care.** All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by unlimited hot-line support.

The BJC™-4310SP. Everything you could ask for in a printer, and a little more. For more information call us on 1 800 021 167.



BJC-4310SP colour Bubble Jet™ printer – \$239<sup>RRP</sup>

**Canon**

Price shown is the recommended retail price including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon and the Canon logo are registered trademarks and BJC, Bubble Jet, Drop Modulation Technology and PhotoRealism are trademarks of Canon Inc. All other trademarks are the property of their respective owners. 1. Output by cartridge may vary based on operating conditions. Super Economy page numbers are based on BC-20 black cartridge with 7.5% coverage and BC-21c colour cartridge with 5% coverage. Super Economy function not available with PhotoRealism inks. 2. Print speeds measured under DOS environment. 3. Fax, copy and OCR functions require user supplied software. Canon reserves the right to change specifications without notice.

CS6013



Defending a defamation case over an email sent by an employee is now a very real possibility for many companies. **By Leif Gamertsfelder**

## Email's special delivery: trouble

Email has become a very convenient, if not essential, tool in our day-to-day lives, both for business and pleasure. However, email is a privilege that can easily be abused, especially in the workplace.

Unsolicited email or 'spam' is one form of abuse with which we are all familiar. The endless stream of junk email is generally a very annoying aspect of having an email account. Most junk email promotes commercial ventures, such as get-rich schemes, search engine submission services or pornographic Web sites.

Apart from being a nuisance to most recipients, junk email can also chew up a large chunk of Internet bandwidth. This is something that concerns companies and individuals alike. However, in the land of virtual milk and honey — the US — attempts to regulate spam have been unsuccessful.

The Netizens Protection Act, Electronic Mailbox Protection Act, Unsolicited Commercial Electronic Mail Choice and E-Mail User Protection Acts have all failed to establish an effective means of kerbing spam. This has largely been due to the constitutional restrictions on free speech in the US, but interestingly the absence of laws in this area has not translated into commercial disaster, although it often leads to major user inconvenience.

Industry groups are using technological means such as filters to block spam. Some agents and entities provide an "opt out" option for recipients, but be cautious; many of these are in fact automatically generated by spamming tools, and replying to them merely confirms to the spamming agent that this is an active address. In many cases, you may need to contact an ISP directly to resolve persistent spamming issues.

When examining Internet regulation issues, we also need to consider the impact of existing laws on the way in which we use current technologies. The law of defamation is one area of law that impacts on how email is used and you should be careful when you use email not to get tangled in the sticky web of defamation law. Anything written in an email (such as a 'flame') or that is included in an attachment (such as a photo) that is likely to injure the reputation of another person may be defamatory in certain circumstances if it is



"published" to a person other than the person defamed in the email.

Publication to a third party may take place if you deliberately or accidentally reply to all recipients or send a copy of the defamatory email. Publication need only be made to one other person. Also, if you send a defamatory email to a person who works in an office and we can reasonably anticipate that the email may be read by others (for example, secretaries often read their bosses' emails and emails can often be read by others when sent to a communal printer) then the publication requirement may be satisfied.

It is also important to note that publication will take place in every jurisdiction in which defamatory email is received. For instance, if a defamatory email is sent from Queensland to recipients in every other state in Australia, the sender may be liable for defamation under the laws of all of those states (except Queensland, because publication did not take place in Queensland). This can be the case even though only one email was sent.

In the case of criminal defamation it is not even necessary to publish to a third party. Publication to the recipient alone may suffice. Accordingly, you should be sure that what leaves when we click the send button doesn't deliver unwanted consequences.

It is also important to note that it's not necessary to intend to defame someone; if the material published in an email is defamatory then legal liability may arise.

There are a number of defences to defamation actions, but they are that easy to prove in court. A much better strategy is to be cautious about what you write in and attach to emails.

Contracts of employment are another reason to be cautious in regards to what you launch into cyberspace. If you work for a company, it is likely that an express or implied term in your contract of employment contains a clause prohibiting you from using the company's email service for private purposes. Technically speaking, a breach of such a term could put you in jeopardy of being terminated.

This is unlikely as most companies don't have, or don't strictly enforce, policies in relation to their employees' private email use. You should check with your system administrator to see whether there are any restrictions on the private use of email at your company to get a clear picture of your contractual rights.

Leif Gamertsfelder practises at Deacons Graham & James. He can be contacted at [leif.gamertsfelder@dgj.com.au](mailto:leif.gamertsfelder@dgj.com.au).

### Links

For examples of Australian defamation laws, visit:

- [http://www.austlii.edu.au/au/legis/qld/consol\\_act/da188999/](http://www.austlii.edu.au/au/legis/qld/consol_act/da188999/)
- [http://www.austlii.edu.au/au/legis/nsw/consol\\_act/da197499/](http://www.austlii.edu.au/au/legis/nsw/consol_act/da197499/)



**PORTABLE**  
 ESS · STOP PRESS · STOP PRESS · STO



**Canon BJC-80**  
**\$399<sup>RRP</sup>**

**Canon BJC-50**  
**\$699<sup>RRP</sup>**



Advanced colour, cable-less communications, optional scanner plus two sizes that are

# Small and smaller!

Canon has a wonderfully new idea for people that need a portable printer. A choice.

On the small side there is the BJC™-80. It is a fraction of the size of a briefcase. Yet, with its in-built sheet

## Drop Modulation Technology.

feeder and power adaptor included as

standard, it is designed for people who have to produce high volume output from a very small printer.

Conversely, if size is critical, there is the brand new BJC-50 with in-built battery. It's not just small, at approximately half the size of the BJC-80 it's absolutely tiny.

Equally impressive, their performance is as big as their size is small.

Using Canon's advanced Drop Modulation Technology™ you can print everything from colour charts, to high quality photographs. Or, in seconds you can convert to extra high-speed black and white for finished business documents using the dedicated black cartridge with 128 print nozzles!

For greater portability, both models include an infra-red port for totally cable-less communications with any suitably equipped Windows® 95/98 notebook or PC.

And, if you really need the functionality of an office in the space of a briefcase, both models will accept an optional colour scanner head in place of the print

## Cable-less communication.

head. It takes only seconds to change the heads. You can then use the scanner head to acquire colour images, or for fax and OCR functions\*.

**Canon Customer Care.** All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for DOS, Windows

3.1x/95/98 and Windows NT.

If you need help choosing between small, and smaller, give us a call on 1 800 021 167.



The BJC-80 fits in approximately half the space of a briefcase. The BJ-50 is approaching 50% smaller still.

## Optional colour scanner.

**Canon portable colour Bubble Jet™ printers**

**Canon**



Ethics are a crucial part of the formal development process in a number of key industries. Should the technology sector be any different?

## Thinking of the future

Technology has become central to the way we work, rest and play. Just as it can bring benefits to society, it can also create a few extra dilemmas. The use of workplace computer systems can result in productivity gains, but also de-skilling, job loss and employee surveillance. Increases and changes to technology raise a number of questions: When is privacy more important than crime prevention and detection? How do we teach our kids to use computers and access information ethically?

Computer ethicist Dr John Weckert believes computer professionals, and everyone who uses computers, should take responsibility for addressing such issues. "More and more people are becoming concerned about the implications of the introduction of IT," said Weckert, a lecturer in the School of Information Studies at Charles Sturt University and a founding member of the Australian Institute of Computer Ethics (AICE). "There are enormous benefits, but there is a growing feeling that we need to be more careful about development, that we should be considering the social implications."

Weckert may be an ethicist, but he is also a realist. "Some people just make technology and don't care about its consequences. You can't preach to them and tell them how important it is. It is a matter of showing them it is important."

The role of ethics in the development and use of technology was the subject of an international conference hosted by the AICE in Victoria in July. AICE was formed last year by a small but active group of academics and professionals who are keen to promote self-evaluation in the IT industry. The aim is to work with professionals and the relevant industry bodies to maximise the benefits and minimise the pains associated with applying new IT tools, said Weckert.

AICE organiser Chris Simpson teaches computer ethics at Swinburne University of Technology's School of Information Technology. "I think mine is the only non-technical course included in the IT course [at Swinburne]. The attitude of the kids to the class is amazing — they ask 'what the hell does ethics have to do with me?' But after they do some reading most see the use and application of the material —



some of course are cynical to the end!

"Until now there has been nothing that addressed technology ethics and most IT&T courses are devoid of this element, which is odd, and potentially damaging. New IT professionals expect to be technically occupied all of the time, but they find that half their time is spent dealing with human beings and social issues. They need to look beyond the project and client, and look at the flow-on effects of their work on other people's quality of life and the environment in general," Simpson said.

"The whole ethos of the community is being altered by technology . . . There are huge areas open to abuse and when we use limited, namely economic, values there are impacts . . . Our set of values should not be limited to the economic, but include human and environment."

Probably the "hottest" topics for computer ethicists at the moment are privacy, intellectual property and censorship, Weckert said. "If the censorship legislation is passed, which it will be, and it doesn't work, which it won't, then it will be a topic of interest for a long time," he said.

"Infringements of individual rights to privacy are more of a concern due to an increase in technology. Workplace surveillance is made very easy. Whether employers can do what they like in keeping an eye on their staff is another matter.

"A survey in 1997 showed that 65 of Australia's largest companies were involved in electronic surveillance of employees. I am not arguing that all of it

is illegitimate, I am just suggesting that the ethics of the activity and its implications be considered. There does come a time when the level of surveillance infringes privacy."

Weckert is also interested in manufacturer/developer responsibility. "Whose responsibility is it when something goes wrong? 'Bugs' don't get in software as if by magic; these things are all related to human error. If you make something, or provide a service, you should be ethically responsible for it."

The AICE has chapters at Swinburne, CSU and the Australian Catholic University, but its numbers will be limited until it is more widely recognised, said Simpson. "We have a moral cringe in this country, where in other countries people are encouraged to speak out about this stuff."

There has been a lot more support for the group from within the IT community than Weckert expected. The Australian Computer Society established an Ethics Taskforce in January 1999. Its aims include the facilitation of discussion on computer ethics-related issues; addressing the ethical issues associated with the creation, development and management stages of computing and information technology, as well as the chosen uses of these capabilities, and networking with other like bodies. The taskforce will cover both computing and information technology, including all aspects of computing and computing-related communications, and their fusion with robotics.

**Selina Mitchell**







# Enter now and WIN!

## ISP Service & Reliability Survey 1999

Welcome to Australian Personal Computer's ISP Service & Reliability Survey 1999.

In our annual survey, we'd like to know what you think of your ISP. How reliable is your connection? How good is the customer service? Has your ISP ever given you grief?

Simply **complete our survey** and you will go in the running to win a fantastic prize, worth over \$3,000! You could **WIN** the ultimate system consisting of:

### Dell Dimension L400c

APC is proud to offer this fantastic prize from Dell, recently voted the top brand by APC's readers in our Hardware Service & Reliability Survey 1999. The Dimension L400c features an Intel Celeron 400MHz, 32M of RAM, 4.3G hard disk drive, 40x CD-ROM drive, built-in 56K 3Com modem, 15in colour monitor, 4M AGP video, sound, Windows 98 and the latest suite from Microsoft Office 2000. The Dell Dimension L400c is worth \$1,699.



### PLUS Epson Stylus Color 900

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All entries must be in by midnight Sunday August 22, 1999.

FAX (02) 9264 6320  
(Be sure to fax both sides through!)

WEB <http://apcmag.com/ispsurvey/>

MAIL APC Service & Reliability Survey, GPO 4088,  
Sydney NSW 1028

Only **ONE** entry per household. Multiple entries will be disqualified. Please read the full conditions of entry **BEFORE** completing the survey.

### PLUS Iomega Zip 250M

Back up your important documents with Iomega's new Zip 250M. This parallel port unit offers great storage capabilities, at 175 times the capacity of a floppy disk, and is backwards compatible with Zip 100 disks. The Iomega Zip 250M retails at \$449.



### 3Com US Robotics 56K modem

Three runners-up will win:

A 3Com US Robotics 56K V.90 External Professional Message Modem, featuring caller ID, built-in speaker phone and remote voice message access, worth \$329 each.



### Your ISP

1. What is the name of your current ISP?

2. How long have you been using this ISP?

- 1 ☐ Less than six months
- 2 ☐ six months to a year
- 3 ☐ one to two years
- 4 ☐ more than two years

3. How did you hear about this ISP?

- 1 ☐ Someone told me about it
- 2 ☐ I saw an advertisement
- 3 ☐ I searched online
- 4 ☐ I read about it in a magazine
- 5 ☐ I received a sign-up CD
- 6 ☐ Other, please state

4. Why did you choose this ISP?  
(You can choose more than one)

- 1 ☐ Price
- 2 ☐ It was recommended to me
- 3 ☐ It is a local ISP
- 4 ☐ I could pay by a method other than credit card
- 5 ☐ It offered free Web space for my site
- 6 ☐ There was an offer of a number of hours of free access
- 7 ☐ It received a good review
- 8 ☐ Connection speed
- 9 ☐ Extensive customer support
- 10 ☐ Other, please state

5. Describe your current pricing plan

- 1 ☐ Hourly charge
- 2 ☐ Monthly charge that includes a limited number of hours or download limit
- 3 ☐ Monthly charge with unlimited use
- 4 ☐ Annual account
- 5 ☐ Prepaid block of time
- 6 ☐ I have a free account
- 7 ☐ Other, please state

6. If you are not on a 'monthly charge with unlimited' use plan, what is the most you would be willing to spend on such a service?

\$ \_\_\_\_\_ per month

7. On a scale of 1 to 10, with 10 being the best, how would you rate your current ISP for value for money? (circle)

1 2 3 4 5 6 7 8 9 10

☐ It's a free account

### Your connection

8. Describe your connection method

- 1 ☐ Modem
- 2 ☐ ISDN
- 3 ☐ Cable
- 4 ☐ Satellite + modem
- 5 ☐ DSL
- 6 ☐ Other, please state

9. If using a modem, describe the type:

- 1 ☐ Internal
- 2 ☐ External
- 3 ☐ PC Card
- 4 ☐ This does not apply to me

10. What is the speed of the modem?

- 1 ☐ 9.6K
- 2 ☐ 14.4K
- 3 ☐ 28.8K
- 4 ☐ 33.6K
- 5 ☐ 56K
- 6 ☐ This question does not apply to me
- 7 ☐ Other, please state

11. Did you buy your modem as part of a PC purchase or was it bought separately?

- 1 ☐ Part of a PC purchase
- 2 ☐ Separate purchase
- 3 ☐ Gift
- 4 ☐ This question does not apply to me
- 5 ☐ Other, please state:

12. How often do you receive a busy signal when you dial your ISP?

- 1 ☐ Several times before I can get a connection
- 2 ☐ Sometimes, but I don't have to wait very long to get through
- 3 ☐ Busy signals are rare — I usually get through on the first or second try
- 4 ☐ I've never had a busy signal with this ISP
- 5 ☐ I have a permanent connection



13. Once you have successfully connected to your ISP, how often does your connection 'drop out'?

- 1 ☐ Almost always
- 2 ☐ Regularly
- 3 ☐ Sometimes
- 4 ☐ Rarely
- 5 ☐ Never

14. How often do you connect to your ISP, excluding busy signals and drop outs?

- 1 ☐ A few times a day
- 2 ☐ Once a day
- 3 ☐ Once every few days
- 4 ☐ Once a week
- 5 ☐ Once or twice a month
- 6 ☐ I have a permanent connection
- 7 ☐ Other, please state: \_\_\_\_\_

15. How long do you usually stay connected for each session, excluding drop outs?

- 1 ☐ Less than 15 minutes
- 2 ☐ About half an hour
- 3 ☐ One hour
- 4 ☐ More than one hour
- 5 ☐ More than two hours
- 6 ☐ I have a permanent connection
- 7 ☐ Other, please state: \_\_\_\_\_

### Customer Support

16. Have you ever contacted your current ISP's customer/technical support?

- 1 ☐ Yes
- 2 ☐ No **Go to question 21**

17. In the most recent instance, how did you contact your ISP?

- 1 ☐ Phone
- 2 ☐ Email
- 3 ☐ Fax
- 4 ☐ Letter
- 5 ☐ Other, please state: \_\_\_\_\_

18. Why did you contact support?

- 1 ☐ To inquire about pricing plans
- 2 ☐ To help set up my account
- 3 ☐ Could not access my email
- 4 ☐ Billing problems
- 5 ☐ Technical difficulties
- 6 ☐ To cancel my account
- 7 ☐ Other, please state: \_\_\_\_\_

19. How would you rate your ISP's customer service?

- 1 ☐ Excellent
- 2 ☐ Very good
- 3 ☐ Average
- 4 ☐ Poor

20. Was your problem resolved within a reasonable time?

- 1 ☐ Yes
- 2 ☐ No

21. Have you ever paid an ISP extra for technical support? (This includes dialling a 1900 number)

- 1 ☐ Yes
- 2 ☐ No **Go to question 24**

22. If yes, name the ISP: \_\_\_\_\_

23. Do you feel the technical support was worth the money paid?

- 1 ☐ Yes
- 2 ☐ No
- 3 ☐ Not sure

### Changes

24. Have you ever used another ISP?

- 1 ☐ Yes
- 2 ☐ No

25. Including your current provider, how many ISPs have you used? \_\_\_\_\_

26. In order, name the ISPs you have previously used. List the most recent first:

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_

27. Why did you leave your last ISP?

- 1 ☐ Too expensive
- 2 ☐ Poor connections
- 3 ☐ Too many busy signals in peak time
- 4 ☐ Poor customer service
- 5 ☐ Incorrect billing
- 6 ☐ The ISP went out of business
- 7 ☐ The promotional offer ended
- 8 ☐ I left the place where I had the account
- 9 ☐ I moved from the area
- 10 ☐ Other, please state: \_\_\_\_\_

28. Do you have any comments about the previous ISPs you have used? \_\_\_\_\_

### Complete to win!

To be in the running for a great prize, simply tell us in 100 words or less what you think of your current ISP. If you need more room, please attach an extra sheet.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Entry details

NAME \_\_\_\_\_ ADDRESS \_\_\_\_\_

EMAIL \_\_\_\_\_

DAYTIME PHONE NUMBER \_\_\_\_\_ STATE \_\_\_\_\_ POSTCODE \_\_\_\_\_

### Conditions of entry

One entry per household. Multiple entries will be disqualified.

The survey may only be completed by Australian residents.

Entries close midnight, August 22, 1999.

Winner's names will be published in the November 1999 issue of *Australian Personal Computer*.

The question at left must be answered to enter. APC judges will select the best response as the winner of the Dell Dimension L400c, Epson Stylus Color 900 and Iomega Zip 250 Parallel. Three runners-up will each win a 3Com US Robotics 56K V.90 External Professional Message Modem.

The prizes are at the discretion of the supplying vendor and may be altered depending on availability.

All surveys, including your comments, become the property of APC and are for APC's exclusive use. Names are not sold or given to other parties.

APC may publish any of the respondents' comments in the reporting of results.

For full conditions of entry, please see page 12.



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NT-A18 SR-A00 SR-A18

## Business File Server



KA-030

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KA-S68 KA-688 KA-S88 KA-K88

## 19"/8U IPC Case



KI-P80

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KI-R11 / KI-R21

## 19"/4U IPC Case



KI-P20

## Removable H.D.D Rack



MR-101 / MR-10S / MR-10U2W

## Micro ATX Series



KA-M90 KA-M80

## 5.25" Removable Backplane



MB-680 MB-480

### NT-A18

- \* Dual cabinet format \*Twelve 5.25" exposed bays on each side \*Rack-mount compatible size (14U Height)
- \* Smart fan modules (12cm, six on each side \*ATX/AT/14/20 slot form factor available)
- \* Hot swappable dual 600W/400W/300W redundant P/S (Optional)
- \* 1.4KV UPS with monitoring Software (optional) \*Fan failure & temperature control alarms
- \* Removable filter function

### KA-030

- \* Excellent front panel design
- \* Dust filter standard built-in
- \* Eight 5.25" exposed bays in front side, six 3.5" hidden H.D.D bays inside
- \* Lockable security access and lockable casters
- \* Elegant LED display indicators
- \* Well cool Air-flow: 9cm Fan x 2 (standard) 12cm Fan x 2 + 8cm Fan x 1 (Optional)
- \* ATX/AT/14 slot form factor available
- \* Changeable power supply back plate PS-2 or AT type power supply
- \* Hot swappable dual 400W/300W redundant P/S(optional)

### KI-P80

- \* Intel thermal & EMC testing approved
- \* ATX/AT/14/20 slot form factor changeable
- \* 8x 5.25" drive bays (optional)
- \* Slide- in/out drive bay structure
- \* Mother-board base slide-in/out structure
- \* Fan failure and temperature control alarms (optional)
- \* Replaceable air filter for easy cleaning
- \* Hot swappable dual 400W/ 300W rduntant P/S (optional)

### KA-M90 KA-M80

- \* Design to meet stringent European EMI & EMS standards and FCC Class B
- \* Screwless, 3 pcs plastic cover for easy installation
- \* Anti-theft cover design
- \* Safe hand cut free edge
- \* Interchangeable ATX I/O shield
- \* Excellent out-look panel Design
- \* Micro ATX/ATX/Baby AT convertible

### KI-P20

- \* 19" 4U rackmount chassis
- \* Up to five drive bays (2x 5.25"exposed, 1x 3.5" exposed, 2X3.5" hidden)
- \* ATX/12/14 slot form factor available
- \* Fan failure & temperature control alarms
- \* Hot swappable dual 250W redundant P/S (optional)
- \* 100% meet FCC & CE requirement
- \* Lockable security access and lockable casters

### KA-S88 KA-688

### KA-588 KA-K88

- \* Design to meet stringent European EMI & EMS standard and FCC class B
- \* Design to combat system over-heating
- \* Removable clean air filter
- \* Security locking plate for the ATX models provide extra security
- \* Extra cooling fan for good thermal solution
- \* Easy install & maintenance
- \* Interchangeable ATX I/O Shield

### MR-101/MR-10S/

### MR-10U2W

- \* Compatible with IDE, SCSI and Ultra 2 SCSI
- \* Power, H.D.D activity, fan failure LED
- \* External SCSI ID selector
- \* Keylock for security and hot swap function
- \* Raid function capability

### KI-R11/KI-R21

- \* 19" Rack-mount chassis
- \* Most compact size for 5.25"device
- \* Fan failure & thermal control alarms
- \* Hot swappable dual 300W/400W redundant load sharing P/S (optional)
- \* Removable shock resistant drive bay
- \* Clear activity LED indicator in front Side

### MB-468/MB-480/

### MB-668/MB-680

- \* Modularized design with hot swappable half height carrier
- \* Designed for 68-pin (Ultra-2,LVD) Wide SCSI or 80 pin (SCA-2,LVD) SCSI H.D.D
- \* Excellent airflow 6cm ball bearing fans at the back side (Standard) & 4cm fans at the front Side (optional)
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# SPECIAL REPORT

Proposals to control Internet access in Australia have ignited controversy on a level rarely witnessed in technology circles. Opponents argue that the new laws place Australia in the same arena as China or Singapore, unfairly restricting freedom of speech and potentially impacting Australia's ecommerce future. Supporters counter that even if the laws are imperfect, something must be done to stem the flow of pornography and criminal information and ensure that children can use the Internet safely. Meanwhile, Web site authors everywhere nervously await the implementation of the new legislation. APC investigates what the new laws propose and how they will change Internet use in Australia.

## REPORTING TEAM

Angus Kidman  
William Maher  
Selina Mitchell  
Roulla Yiaccoumi

# Get ready for

**W**hile the Broadcasting Services Amendment (Online Services) Bill 1999 was making its controversial passage through the Senate in May, Melbourne IT professional Susan Whitham was making a few decisions of her own. Whitham and her partner Kevin Littlejohn decided that if the Federal Government was going to go ahead with plans to place controls on Internet content accessed in Australia, they would leave the country and seek work elsewhere.

"Moving overseas is not a decision we are taking lightly — but we are taking it," Whitham said. "Canada or Europe seem to be the places of interest to us, especially with the Canadian decision recently not to regulate the Internet." Whitham said she and her partner would give themselves "just over one year to get ourselves financially set up for such a move", and said she knew of four others prepared to do the same.

While only a handful of people are likely to emulate Whitham and Littlejohn's examples, many existing Web site operators have already decided to host their sites overseas, where they believe they will be out of reach of the new regulations, even though those regulations don't come into place until January 1, 2000. Still more Netizens have protested about the laws via email, to the point

where Parliament House servers have crashed more than once under the strain. When the Federal Government announced its plans for content control in March, it probably didn't anticipate these kinds of reaction.

Throughout the difficult debate about the legislation, which was passed by the House of Representatives in June after a hasty Senate Select Committee hearing, the government has maintained that ensuring a safer Internet regulated in the same manner as other media is its only goal. On more than one occasion, IT minister Senator Richard Alston accused opponents of the bill of supporting illegal activity.

"Any attempt to interfere with these protections will have the effect of making it easier for paedophiles, drug-pushers, racists and criminals to pollute the Internet," he said in a statement at the height of debate.

The desire by the government to court the vote of independent Senator Brian Harradine, a staunch anti-porn campaigner, was another critical factor in the bill's introduction. However, Harradine declared his intention to vote against the GST before a decision was made on the online services bill. (By the time you read this, Harradine's vote will have lost its significance and the Democrats will have control of the Upper House.)


The complicated political machinations behind the introduction of the bill, and the speed with which it was pushed through the Senate, have left a sour taste in the mouth of many Australian Internet users. Last-minute changes and the lack of any specific indications of how content will be controlled in the bill itself, have also led to confusion (and in some cases






## Points of view

Net content control proposals have many opponents, but also some high profile supporters.


 "We realised that if efforts were made to censor the Internet, it would strangle the growth of the Net. So we called for governments to do something that they find difficult — do nothing at all. We've got to empower people to protect themselves."

**Ira Magaziner, US presidential technology advisor, who argues that no government can control pornography**


 "We support the bill as a reasonable attempt to balance the rights of adults with the rights of children to be protected."

**Barbara Biggins, president of activist group Young Media Australia, which wants to see more money spent on educational programs**




 "Pornography is one thing . . . but it's also one way they can stamp out minority groups. Gay, lesbian and AIDS seem to be some of the keywords for censorship."


**Sister Mary Mary Quite Contrary, Order of Perpetual Indulgence**

 "This bill is a disaster as far as the Australian adult industry is concerned."

**Robbie Swan, spokesperson for adult industry group Eros Foundation, who says that adult sites will move to the US**


 "You can't cover the ocean with a fence around it, like you can a swimming pool."

**Michael Soker, managing director for classified site Free4All, which plans to move offshore in the wake of the legislation**

 "I think it's a step in the right direction and as such I'm supporting it."

**Independent Senator Brian Harradine, whose vote was crucial to the passage of the bill in the Senate**



 "I say to those who are protesting against it that you don't understand the mood of middle Australia on this, you don't understand how deeply many parents feel about it, with some justification."

**Prime Minister John Howard**

duct criminal activities. X-rated material (essentially hard-core pornography) does not suffer the same restrictions in other mediums, which can be freely purchased on video from Canberra and the Northern Territory, for example. The legislation is designed to apply to Web sites, news-groups and other forms of online communication. It specifically excludes email, although government officials have suggested this might not apply in all cases.

The biggest question is how such restrictions can be implemented in practice. Controlling material hosted on servers located in Australia is (at least theoretically) straightforward. A general code of practice proposed by the Internet Industry Association (IIA) late last year suggested that ISPs remove from their servers material deemed to be illegal, so this is not an entirely new concept.

However, what can be achieved with sites hosted overseas — which are the dominant source of Net information accessed in Australia — is a much stickier point. ISPs have been quick to point out that it's not technically practicable to maintain a list of banned sites users shouldn't access, both because this would slow access down to a crawl and because sites appear and disappear more rapidly than any current technology (or human) can track. The legislation itself doesn't include any suggestion as to how this will be achieved; government officials argue this will ensure it doesn't quickly become outdated.

The missing link is supposed to be provided by a code of practice, which will be developed by the IIA. The code will outline steps ISPs should take to block illegal content. Changes made to the legislation during debate included a requirement that such steps be technically and economically feasible, but Senator Alston has made it clear in interviews that this is not to be used as an all-purpose let-out clause. Supporters of the bill argue that even if a technology is not currently available to achieve effective content restriction, one could soon emerge, although some early candidates have already run into problems (see 'Clairview not so clear', page 66).

The IIA needs to work fast to provide a code. This is because the legislation also outlines a complaints mechanism, which would be managed by the Australian Broadcasting Authority (ABA). In the absence of an accepted code of practice, this will become the de facto means to control Net access in Australia (although the government also plans to establish a

outright paranoia) concerning how the legislation will be implemented. As the dust settles, however, Australians will have to ready themselves for a new experience of the Net in all its forms.

## How does it work?

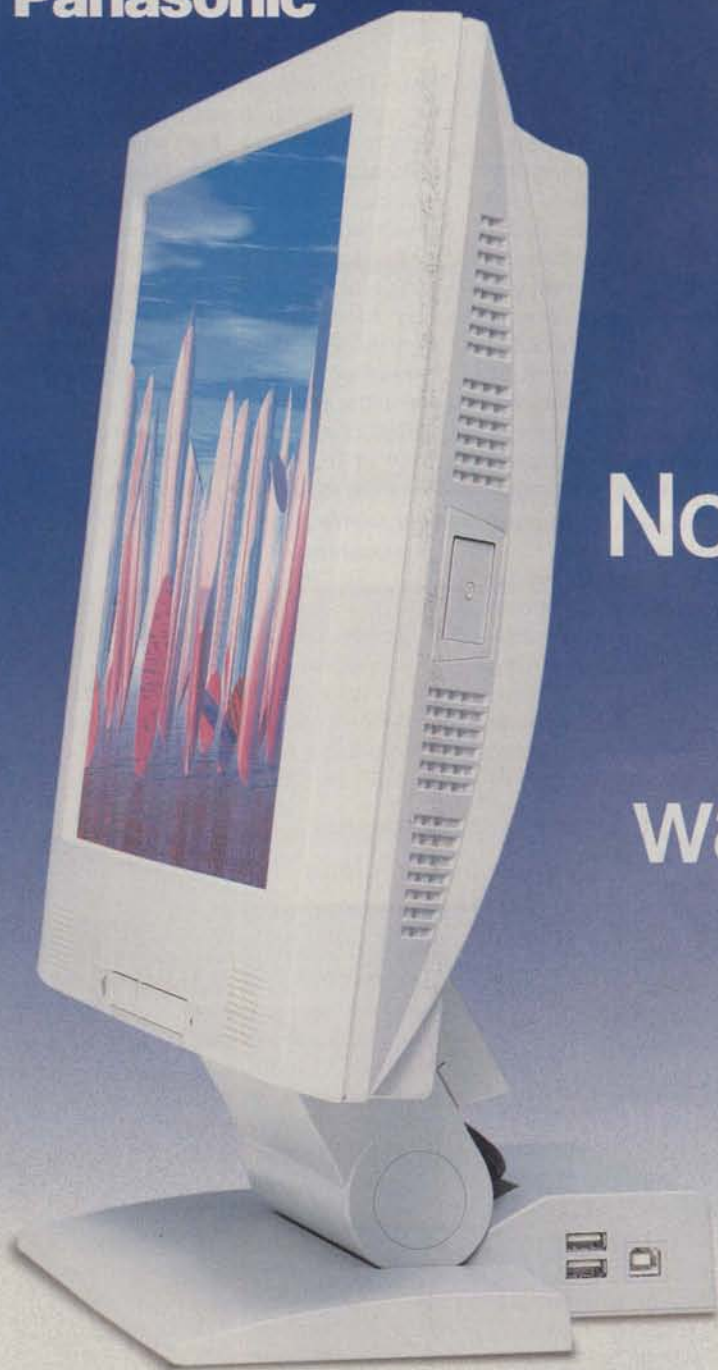
The main intention of the bill is clear enough; it aims to apply regulations to Internet content similar to those already

used on other media such as books, movies and computer games. In practice, this translates to barring content that would be given an NC (not classified) or X rating and demanding content that would receive an R classification include some form of password protection.

Material that has been refused classification in other mediums in the past includes violent pornography, paedophilia and information on how to con-



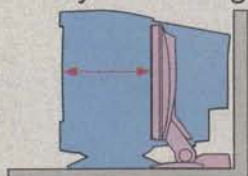
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community body to monitor online material and educate the public). The government is also actively promoting the notion that ISPs could use the ability to filter out content as a point of differentiation to sell themselves to a family market.

If the ABA receives a complaint about a site and determines it illegal or pornographic (a task for which it will call on the judgement of the Office of Film and Literature Classification), ISPs must cooperate by removing the site. Failure to do so could invoke large fines.

## Cost control

While ISPs grapple with the practical problems associated with content control and blocking, the ABA faces a challenge of its own; funding the complaints service.

To help cover the costs involved in assessing complaints, the government assigned an additional \$7 million over four years to the ABA in this year's Federal budget. With this money, the ABA plans to appoint five new staff before the end of the year. This number will be increased once the complaints body is set up early next year, Andree Wright, director of policy and content regulation at the ABA, told APC.

The extra funding allocated to the ABA has been divided evenly over four years, so spending for 1999 to 2000 is set at \$1.26 million, despite the fact that setup costs for the service will be high. For each of the subsequent three years, the ABA has \$1.9 million allocated for online regulation, which has to cover the complaints mechanism, assessing the voluntary codes created by the often volatile Internet industry, and research into consumer satisfaction with the code. The funds represent about 8% of the ABA's \$15.87 million annual budget.

Many industry observers aren't convinced the funding will be adequate. "The discussion we have had would indicate that it is not, but we have not done a study ourselves," said Australian Computer Society (ACS) president Prins Ralston. "I would have thought that if they were serious about this, they would throw a lot more at it."

"The ABA certainly has a big ask," said Kimberley Heitman, chairperson of online activist group Electronic Frontiers Australia, which is firmly opposed to the new legislation. "The ABA will have five staff, a national hotline and a lot of money. If [it] can achieve [what it sets out to do], I will be very impressed at the productivity of our public servants," he said.

## Waiting for that day

Between now and the beginning of the year 2000 (not a promising date for starting any IT-related legislation, as more than one wag has pointed out), intense debate on the topic of Net censorship is likely to continue. The government, which is maintaining a 'silent majority' defence of the legislation, is now leaving implementation to the ABA, which has to track the development of industry codes of practice. Actions opposing the bill have ranged from a series of national protest marches in May to the collation of data demonstrating how many public servants routinely access Internet pornography from work computers.

It is difficult to predict how the legislation will pan out. Some Internet activists are already threatening to flood the ABA with complaints about overseas sites come January 1 in order to demonstrate the scope of the problem the legislation is trying to control. Other observers have suggested that once the mechanisms are actually in

place, they may quickly fall into disuse as the attention of government and media shifts to other issues. Both supporters and opponents agree that educating the wider community on using the Net and filtering unwanted material is essential, whether the legislation is in place or not.

The biggest problem the government may face is placating Netizens like Whitham and Littlejohn. Given the increasing emphasis politicians are placing on the need to develop technologically skilled communities and workers, the irony of implementing legislation that threatens to decrease rather than increase their numbers might prove more than a little crushing.

Visit <http://newswire.com.au/censorship/> for in-depth, ongoing coverage of developments in the Internet censorship legislation issue, and the chance to put forward your opinion.

## Clairview not so clear

During the Senate debate concerning which technologies could be used to implement the Net content control legislation, Brisbane company Clairview was repeatedly mentioned as an example of how technology could help control the Net. Clairview was working on a predictive filtering technology, known as Internet Sheriff, which would proactively block sites based on a set of user-defined criteria. The company's CEO Allan Jones appeared before the committee to explain the product and its features.

Although Clairview enjoyed a low profile prior to the hearings, it soon found itself in the unpleasant glare of the public spotlight as Netizens reacted to the claims being made on behalf of the company. John Stuckey, CEO of Australian ISP Connect, wrote to Senator Alston and said tests conducted by his company showed that the product's capabilities had been overestimated, it was easy to bypass, and implementation costs would top \$1.5 million. "If the review committee is seeking to rely on this technology as a key component of the argument for enforceability then I believe Connect.com.au's technical team should have the opportunity to present the reality of what is being sold, as

opposed to what actually is deliverable."

At the same time, Electronic Frontiers Australia (EFA) released test results for the Sheriff system, conducted by three of its members. According to the EFA, the system frequently blocked sites with no illegal content and often blocked entire domains, including leading ISP OzEmail and free home page provider GeoCities.

By that stage, Clairview had changed its name to tel.net Media and was seeking to distance itself from the entire affair. "We have been ordered around as a failure and the enemy and it's not true... we're just technologists," Jones told APC.

Jones said the Sheriff system's strength was high-speed filtering. "Can we make mistakes? You bet we can. You can never be perfect." Manual intervention is required to prevent innocuous sites being blocked by Internet Sheriff, he added.

The company also downplayed suggestions it would profit from the legislation. "We don't necessarily expect the legislation to be a win for us. The proof is in the pudding," said tel.net Media director Ryan O'Hare. However, Clairview's experiences may well give pause for thought to other companies seeking to offer technologies to help control Net access.



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MUSIC

By Selina Mitchell



The music industry thrives on change, and the Internet has become its latest impelling force. The rise of the Net as a music distribution medium threatens to change not only the sound of music, but also the entire mechanics of the industry. Are Australian musicians and record companies ready to face the digital challenge? And will consumers be any better off listening to MP3s rather than CDs?

When Cold Chisel released what appeared to be its final single, 'Flame Trees', in 1984, it was available in just one format: a 7in vinyl single. In July last year, the band's comeback single, 'Yakuza Girls', was available in just two formats: RealAudio and Liquid Audio. Instead of queueing outside a record store, fans had to wait until midnight to download the song from a band-sanctioned Web site.

This switch in approach (see 'Chiselling away', page 70) signifies the changes the Net has made to the music scene. Although resistance in some quarters remains strong, musicians, record companies and consumers are all discovering the advantages and disadvantages of using the Internet as a tool for music creation, promotion and distribution. Many people in the music industry now accept that the future is digital, like it or not, and are taking steps to prepare for the changes.

Internet-savvy consumers are already going online to satisfy their music needs, accessing legal, and often illegal, content. Like many Internet 'revolutions', hype is prominent and some are declaring the CD, as well as record companies and copyright, dead. Most industry figures, however, believe the Web will move from a music pirate's paradise full of disorganised download sites to yet another ecommerce growth engine within a few years. The growth will not replace but rather augment CD sales.

According to a Forrester Research report, *Virtual Music Rocks*, initially the drive won't come from major record companies; it will come from independent music labels that put content online, and technology companies that develop new music

playback devices and formats. Ultimately, success depends on digital music downloads gaining mainstream support by promoting mainstream content. This will only happen if popular artists, and their record labels, support the moves.

Established artists are beginning to dabble with online technology and are creating Internet sites predominantly for promotional purposes. However, most record labels are playing a game of wait and see, and steering clear of music downloads. They could need to change this stance shortly. According to Forrester, digital music downloads will add \$US1.1 billion to the US music industry by 2003.

Most Australian musicians APC contacted didn't even consider using their sites to make money; they simply use them as another form of expression and communication. Contractual restrictions prevent those who are signed to major record labels from offering full-length downloads. Those who aren't signed to the majors, such as jazz musician James Morrison, are able to be a little more adventurous (see 'Jazzing up the digital scene' on page 72).

For new and unsigned artists, the Net offers opportunities and dangers. Although the Web provides an easy distribution path (as local band Seventh discovered, see page 74), this same free access could create piracy nightmares later.

The emerging importance of the Internet to the Australian music industry is highlighted by the inaugural Onya Australian Online Music Awards, presented this month. The Onyas coincide with the fourth National Entertainment Industry Conference (NEIC), which will focus on how technology, most notably the Internet, is changing the way music is sold.



## The pioneering MP3

The popularity of downloadable music is largely due to a single concept: MP3. The digital compression standard formally known as MPEG-1 Audio Layer-3 is only one of several formats used to store music (see page 82). However, small file sizes, relatively good sound quality and ease of use have ensured MP3 has become the de facto standard for digital music distribution. Consumers have embraced the format, but those selling and creating legitimate music blame MP3 for an increase in pirated music. "Despite efforts to curb piracy, it will be impossible while MP3 remains the format of choice," the Forrester report states.

Most legally licensed MP3 content is from unrecognised or 'has-been' artists. You won't find official releases from many popular acts, though you will find a lot of unofficial material. Dominant international record labels such as BMG, EMI, Sony, Universal and Warners are loath to use a format over which they have no control.

Forrester estimates that by the end of next year there will be 50 million MP3-capable users accessing four terabytes of MP3 music on the Web. However, the MP3 phenomenon is not only driven by eager listeners downloading free music they would otherwise have to buy. It is also driven by artists keen to distribute their work, many of whom believe the format will eradicate the need to sign with record companies.

Musicians seeking to establish an audience are also eagerly taking up the technology; they don't care how many copies of their work are distributed as long as they gain an audience. Local music sites such as ChaosMusic encourage artists to use free MP3 downloads to help build an audience.

Although MP3 is currently the dominant standard, concerns about security, compression rates and sound quality mean it is likely to be replaced. The major record labels, and a number of technology development giants, are working on alternatives.

## A secure alternative

In response to the growth of the MP3 format and concerns about its use, the Recording Industry Association of America (RIAA) established an initiative to develop its own format for distribution and storage late last year.

The Secure Digital Music Initiative (SDMI) consists of paying representatives from the music and technology industries. Its aim is to develop an open, interoperable architecture and specification for digital music security that meets consumer demands for convenient accessibility to quality digital music, enables copyright protection, and generates business.

SDMI's two major focuses are the development of a specification for secure music downloads to be built into any download technology (this should be finalised by the end of March next year) and a specification for portable playback devices (the preliminary standards for this should be finalised by the end of July this year).

However, attempts by the music industry, via SDMI, to define format and player standards are moving too slowly for some. Developers are elbowing each other to come up with what will be the preferred solution for online music distribution as fast as possible. Some platforms and players were already in development before SDMI came along, with varying degrees of security and success, including AT&T's a2b, Liquid Audio, RealNetworks' RealJukebox and Microsoft's Media Player. MP4, another proprietary format with added security (and no relation to MP3, despite its name) has received some support from Australian artists.

Since SDMI was established, AT&T, Universal, BMG Entertainment and Matsushita announced a joint agreement to develop and test technology for large-scale, secure music and media distribution. Universal also has a deal with InterTrust Technologies to develop a secure format, while Sony is working on another proprietary format. Most of the record labels also support IBM's

Madison Project, which involves consumer trials of its Electronic Music Management System by subscribers of a high-speed cable service in San Diego.

## Pirates ahoy!

In the meantime, the record industry is attempting to crack down on piracy. The

## Chiselling away

If you've been out of the music industry for 15 years, how do you come back with a bang and maintain your rebel image, albeit with a few wrinkles?

Oz hard rockers Cold Chisel answered this question last year by turning to the Internet prior to the release of their comeback album, *The Last Wave of Summer*. The band decided to release the album's first single, 'Yakuza Girls', online only; it resulted in a download frenzy.

At midnight on July 7, the time of the launch, there were 10,276 visitors waiting on the <http://coldchisel.com.au/> site, said Jimi Bostock, manager of SafetyWeb Internet Solutions, which helped develop the site. "In the first 12 hours there were 228,596 downloads of the song — this would have been triple platinum in sales terms." In the first hour 2,980 email reviews of the song were sent back to the site. A year later, the song still attracts about 1,200 listens a month.

"The idea of offering the song online struck our rebellious side," said Chisel's manager Rod Willis. "There is so much paranoia and fear about giving this stuff away!" Willis noted, however, that the song might not have received

extensive commercial radio airplay if it had been released in a conventional format, due to its lyrics.

Willis said the band wasn't concerned about piracy. "If people want to record a song they can record it off the radio. It's all there for the taking.

But if they really like something, they will go and buy the album. We have never discouraged people from taping our concerts and playing them to friends. It builds a following. If they tried to sell a bunch of copies we would go at 'em."

The rebel image is still being guarded as well. "We didn't want to make out that we are Net heads — we're not," Willis was quick to add. "For us it's just another way of exposing the band to the masses."

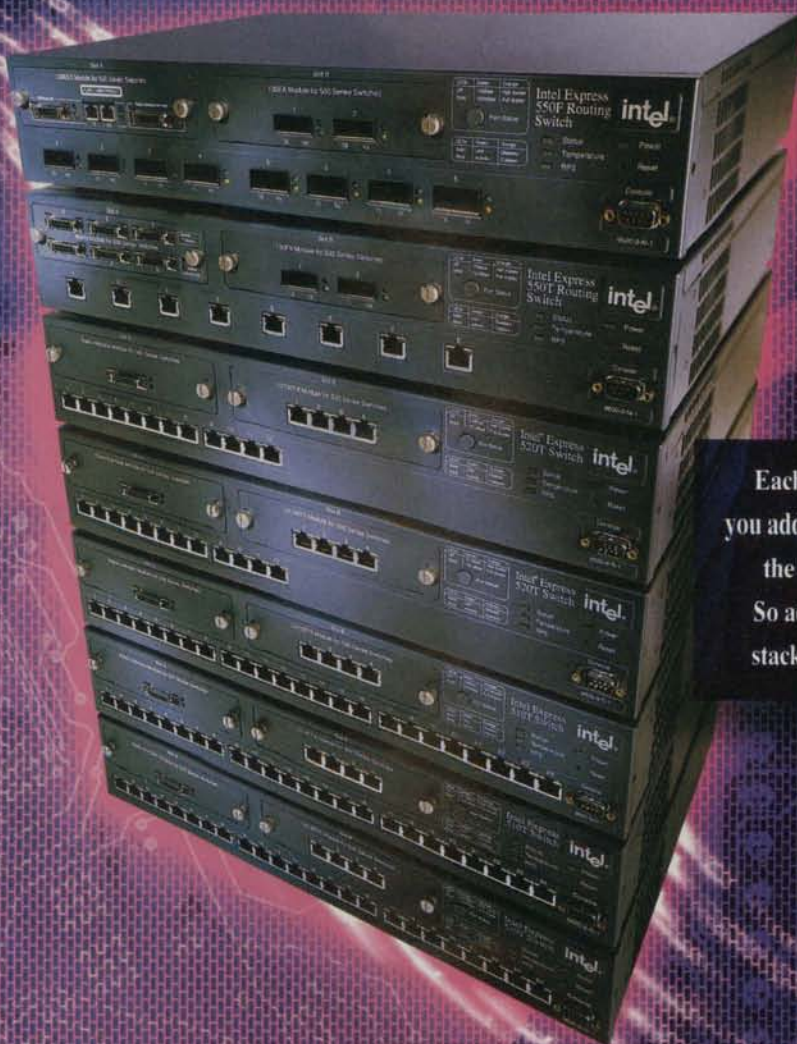
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International Federation of the Phonographic Industry (IFPI), which represents the \$US38 billion international recording industry, estimates illegal recording sales reached about \$US4.5 billion last year. It has reported that growing levels of theft on the Internet have compounded the problem.

Litigation has been used to try to slow the spread of piracy without success. The RIAA failed in its attempt to stop the release of Diamond's Rio MP3 player last year, for example, and others have since entered the market with similar devices (see 'Portable MP3 players', page 76).

In March of this year the IFPI launched criminal proceedings against Norwegian search engine software company FAST Search and Transfer ASA, which provides a directory of MP3 audio files that IFPI regards as pirated. The investigation is ongoing, but other sites are emerging. ChaosMusic has released its own search engine, FreeTracks, which indexes and searches for digital music formats on the Web.

"Just like any other search engine, it is up to the end user to make a decision about the content that is being searched," said ChaosMusic marketing and sales vice-president Victoria Doidge. Although there were requests not to serve illegitimate files, it would be impossible to achieve, she said.

Record companies believe the Internet has become a conduit for piracy, but all communication tools have some piracy risks, said Phil Tripp, founder of entertainment company Immedia and organiser of this month's NEIC event. "You can't prevent people from making a profit from piracy in this format, just like you can't stop everyone from raiding hotel minibars," Tripp said.

Not everyone agrees. The Australasian Performing Rights Association (APRA) is urging caution in the use of MP3. "It is a decent tool to get exposure, but it is not the utopia of total control that some artists are hoping for," said APRA director of broadcast and online licensing Richard Mallett. "The more popular the artist, the more they are concerned about security, but all of them should be concerned. If you allow music to be downloaded in an unencrypted format you are giving away all your rights. Who is to say that is not going to be the song that makes or breaks you?"

## No CD required

Most agree the music industry needs to see past the piracy issue to the advantages of online distribution, and work towards appropriate solutions. The opportunity is

## Jazzing up the digital scene

Australian jazz musician James Morrison has always been an early starter. He got his first instrument at the age of seven and was playing professional gigs at 13. Morrison's adoption of the Internet to sell and expand his work is no exception. A long-time gadget lover and an established recording artist, he has his own record label, and is keen to exploit new technologies to enhance his business.

Unlike most other labels in Australia, Morrison Records has been selling music online for some time. Performances can be booked by email and the labels' copyright music is available for download. About 8% of total sales are online, up from 3% just a few months ago, and Morrison doesn't see it levelling off. "Music is the perfect product for online sale. It's all in ones and zeros anyway. The site is a major way for us to promote and supply our music.

"At this stage it is all about embracing the technology, and offering downloads. It is time to get the technology accepted. There will be time to make money from it later. People have got to get used to it first."

The same applies to musicians themselves, Morrison believes. "Many

artists don't understand technology. They don't know about [basic music technology] let alone the more technical stuff. But you need to realise that what you don't know you are going to have to depend on someone else for, and lose the control that might have been possible."

Morrison likes control. He is reading up on relational database theory so that he can meet with the person who will design the database for his site and be able to have educated input. He also welcomes the continual promotional opportunities and audience contact the Net provides. "A whole lot of people saw me last night [on my site] and I didn't even go anywhere."

Online technology also changes the creative process in subtle ways. "Because a lot of stuff is being done online it gives me more time to write songs," he said. Also, the change from a fixed-length format for albums presents new opportunities. "With the Internet you can pick and choose the amount of material without considering how much time or space it takes up. [As well,] I will be able to pop up on the screen and tell people about what I recorded and why. I think they will like that."

**Selina Mitchell**



far greater for record companies than they initially realised, said Tripp. Distribution and production costs are far lower and every download offers the chance to know exactly who is listening to the music, he said.

Local online audio site Pocket Sounds has taken on a 'no CD required' policy. A joint venture between Right Angle Media and The Royal Melbourne Institute of Technology, Pocket Sounds plans to sell 'audio art' in a number of formats on its site. CEO Lindon Parker said content will be sold in single pieces rather than in album formats. "If you are spending \$1 for something you can pick and choose, you are more likely to do so, and take risks about getting some you may not like."

Museek.net takes a similar approach, offering new artists record company-style

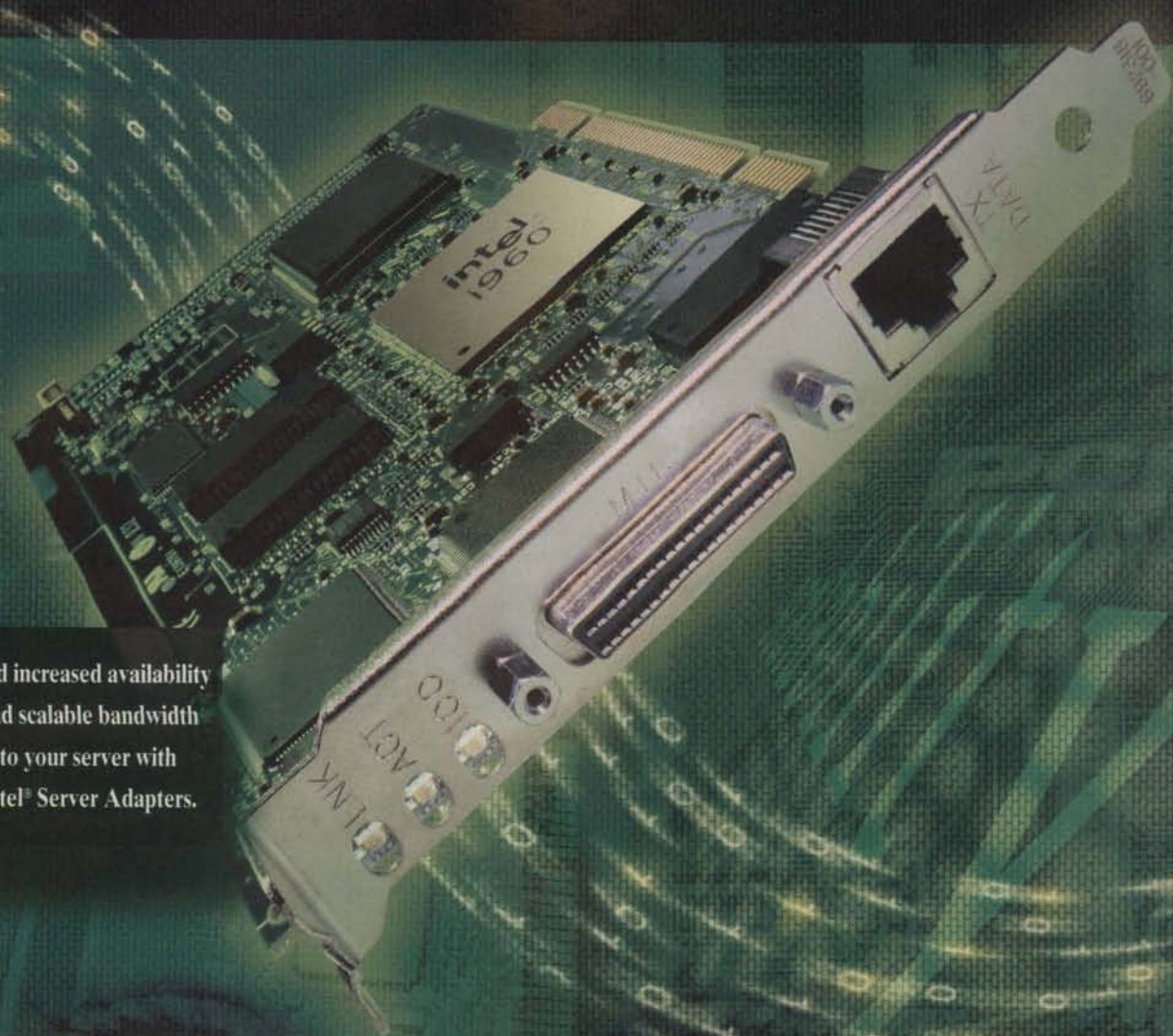
marketing and online support, but it charges a fee. "We wanted to build something that we would have liked to use," said director (and former musician) Rob James.

According to the Forrester report, initiatives from smaller niche companies and independent record labels will lead the way in the digital download drive. Local independent label, Shock Records, is taking the lead. "We are not constrained, as labels are, by global corporate directives and decision-making processes that slow things down," said Shock Records general manager Charles Caldas.

Shock developed its first Web site in 1996. Since then it has moved from providing limited information on the site to using it as a full-blown marketing tool that includes singles downloads. "It's not



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## The Net road to success

A lot can happen in 14 weeks. Just ask the members of Seventh. The band tape-recorded some original songs using an old microphone dangling from the roof in a vacant shop in Wagga Wagga, NSW. The taped music was converted to WAV files, then uploaded to a Web site in MP3 format. It was poorly recorded, but the music was good enough to attract plenty of attention.

Three-and-a-half months later, the site has had 293,933 visitors and 823,811 downloads. Seventh recorded 750 copies of an EP which was sold on the site (and then through ChaosMusic and more traditional retail outlets) and it has now sold out.

Seventh's quick success is the result of some loud door knocking, Internet-style. The band's 'front man', David Rivera, is also Seventh's Webmaster. Rivera has always had a keen interest in technology and graphic arts and started out developing sites for farmers in the region.

Once he put Seventh online, he started seeking support. "The Internet is the most cost-effective way to promote anything, but people have to know you are there. I emailed bands asking them to listen to our music and

link to our site from theirs — many didn't respond." Some important ones did, however, including Korn. Soon MP3s of the band's songs found their way to MTV in Europe (which emailed asking for a video version), as well as many home PCs.

"I knew if we could get on the Web and get people to listen, we would be OK," Rivera said. But the band's success online has had one drawback: many in the industry think they are already signed to a record label. In fact, the record companies have been harder to contact online. "There are no details saying email us here with your new music. Imagine how much stuff they would get!" Rivera noted.

Seventh's attention is now focused on producing another album and playing live, with the ultimate aim of getting signed. Efforts continue to be made online to gather support, but more

traditional methods are also being tapped, including entering a national band competition. "Before we were keen to remain independent but we have gone about as far as we can go. Now we really need a label to get ahead."

Selina Mitchell



about losses, but opportunities. Don't focus on sales lost through piracy but the advantages of building up a contactable fan base, for instance. Usually it's one song off an album. You may lose a few singles sales but it is worth it in terms of word of mouth value.

"Radio is very conservative, but the youth demographic is already online. It is a great opportunity to have people heard. We will eventually sell downloadable music online, once the right format is found," said Caldas.

At the moment though, Shock's Web

site is operating at a loss. "We are very much in the spending phase. We hope to reap the benefits later down the line. Soon there will be more people in the loop and that will increase the reasons to put music online."

Caldas predicts that the major record companies will come online slowly but surely. "[Record companies] can only bury their heads in the sand for so long. Things are changing and they will change too. Physical sales are down in Europe and that must be, in part, due to downloads. That will make them move."

Forrester surveyed the five big record companies in the US and found they

were happy with the pace of change. Companies expect music downloads to remain a niche business for some time but predict it will eventually boost revenues by up to 15%. They also believe distribution, regardless of the form it takes, will remain in the hands of the traditional players.

Some record companies, though, are aiding Internet innovation now. Custard, one of Australia's most progressive Net-using bands, has had the help of its record label in its endeavours. BMG is funding online chat sessions, concerts and Web sites developed by band members (see 'Custard takes the Internet gravy train', page 78).

In the US, the major record labels have announced a number of moves to exploit public interest in digitally delivered music, apart from their work on standards. Sony Music will test the use of digital kiosks in retail outlets, taking the music download experience from the PC to the traditional sales marketplace. Initially the Digital-On-Demand vending machines will offer consumers access to Sony albums that can be copied to CD, DVD or MiniDisc. Once a secure standard is developed, the kiosks will also download to digital music players. (A similar concept is already being tested in Melbourne music store Gaslight.) Some see such moves as an attempt to ease retail outlets' concerns about losing sales to online retailers, including the record companies themselves.

"Clearly the Internet will change the way we listen to and shop for music but there is a lot of hysteria," said local label Festival's managing director Jeremy Fabinyi. "The talk of the CD being replaced and copyright being dead is nonsense. The Net should be guiding thinking and development. It won't replace the CD or any other medium. It could, however, generate extra growth." Festival Records' artists are already participating in ChaosMusic's digital endeavours.

## So what's in it for us?

While the record labels plan their strategies, the Net is already providing consumers with a new and more accessible way to discover music. It is also providing aspiring musicians with a whole new platform. "Retailers only sell the Top 40," said Immedia's Tripp. "The Internet allows people to discover something different."

At the moment it is often difficult to discover anything except by accident. Download sites (such as the much-discussed MP3.com) are disorganised and domi-



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nated by new artists. The whole process lacks convenience; it can take a long time to access even 'instant' streaming files, let alone save tracks to a player. Sound quality also varies widely.

This may change, however. The Forrester report predicts players will become more diverse and popular, and legitimate content will increase. The number of delivery platforms will diminish and access to broadband services will lower download times. Eventually, players will become points-of-sale, allowing consumers to download songs via the phone or from a kiosk at the supermarket.

There will be increased competition for the entertainment dollar, said Shock's Caldas, who hopes more music will be integrated into other forms of entertainment. "You may listen to the latest music and see ads for records on billboards when you play a game. A lot more game developers will tie to artists and use their work instead of the generic bleep-blurp stuff," said Caldas.

There are concerns, though, that a new focus on downloading music will decrease its significance. "The Internet tends to make music more disposable, and that worries me," said Paul Medew, bass player with Australian band Custard. "There's something nice and tangible about holding a shiny disc in your hand and reading the CD booklet. I think it makes you value it more than if you just download it onto your hard drive."

Tripp is also concerned about music becoming less of a collectable. "Hopefully it will be like listening to the radio. If you really like it, you will buy it to keep. It's just that the format will change."

James Morrison provides another view. "Some people like to walk into a room and see plastic collections of music taking up space, and will miss that. [But] I think it's great that it will all be stored on a hard disk and you won't be able to see it — or have to dust it."

Technology-literate musicians are starting to collect their own pieces of plastic: PCs and equipment for home studios. "Home studios are changing the music industry," said Medew. "The ease with

which it is done means the record companies are becoming fairly irrelevant. It costs next to nothing to set up — well, \$5,000 in infrastructure investment."

Artists are also using the Net to help compose music. Email has proved a bonus for many, not only to keep track of each other in an incredibly mobile population, but also to co-write songs, arrange overseas tours, and to produce music. In March of this year the first ever 'Internet single' was recorded, with a number of musicians participating in the recording from various locations.

Access to music-making software and technology has led to more people with musical ambition trying their luck. Tripp suggests that as a result there may soon

be a lot of third-rate material being peddled online.

Others, such as Museek.net's Rob James, believe that one person's trash is another's treasure. Instead of record companies making the decision, he hopes listeners will be able to decide.

## Promotion, promotion, promotion

One challenge that faces any musician who plans to use the Net is the need to be noticed. Web sites for established acts, whether authorised or not, can quickly attract an audience as fans visit to find out the latest gossip, tour dates, and details of

## Portable MP3 players

Perhaps the biggest visible impact of online music in the real world has been felt in the portable music arena, where a new range of devices based on the MP3 standard has emerged. Like the Walkman, these MP3 players are small devices designed to play music through headphones or external speakers, but that's where the similarity ends.

Other devices use CDs or cassettes, but the MP3 player stores music on in-built or removable memory cards. Not only are these cards small, but they also eliminate the need for moving parts, which inevitably wear out. This also means MP3 players are not affected by sudden jolts, which can cause music to skip in CD players.

MP3 players also offer

advantages when it comes to recording music. Music files can be created from audio CDs or downloaded from the Internet. Transferring music to the player is also a relatively quick process, as the files can be

copied directly instead of recorded in real time.

Despite these benefits, there are also a number of drawbacks associated

with players based on the MP3 format. Audio quality is variable and depends heavily on the sampling rate used to create each music file. Another major concern for portable music buffs is that without several removable memory cards, there is no way to change music on the fly.

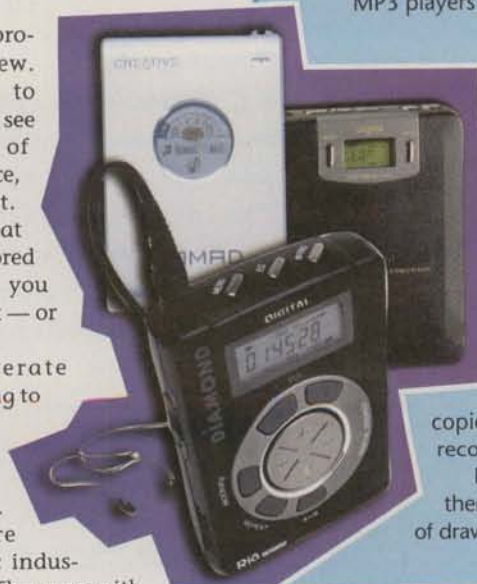
In the US, the release of portable MP3 players have been met with fierce opposition by the Recording Industry Association of America (RIAA), which is concerned about the distribution of illegal MP3 files. However, it has lost out in the legal arena to date. Australian authorities have not been as vocal, although there are still only a limited number of models available locally.

There are currently only three portable MP3 players available in Australia; the MPMan, Diamond Rio and the recently released Creative Nomad (reviewed on page 29). Like any new technology, these devices are relatively expensive. At the time of writing, prices started at \$339 for the Diamond Rio, \$460 for the MPMan, and \$499 for the Creative Nomad.

Vendors expect prices to drop with the introduction of second-generation players such as the new Samsung Yepp and the MediaForte jazPiper. These units include new features such as FM radio, voice recording, data storage and most importantly, extra memory.

Manufacturers have also started to experiment with in-car MP3 players and standalone units designed to play MP3 CDs.

**William Maher**





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new releases from their favourite artists. If these sites are listed in popular search engines and directories, they can generally build a following. But what if you don't know what you are looking for?

A Web site may provide the opportunity for a new band from the back of Bourke to build up a global gaggle of fans or even stitch up a deal with an overseas record company. However, it is not likely to happen without a little extra help.

One common approach for new artists is to work through music hub sites such as MP3.com and ChaosMusic and hope that their music will stand out from the crowd. Shock's Caldas doesn't think this approach will be successful. "There are more opportunities there but the dilemma is how do you get people to come and listen to you?" he said. "They won't go to Web sites featuring thousands of new artists and go through them all."

APRA is also urging caution, saying it is difficult for an unknown outfit to achieve success through the Net, but artists APC spoke to were more positive. They suggest storing music and information on a Web site as a reference point for interested parties. The Mavis's Matt Thomas advises people send email to band managers, their favourite artists and the record labels, and get them to link to their site or at least go and listen to some song snippets (see 'Playing around with the Mavis's' on page 80).

Matt Handley, a member of Australian independent band Pollyanna, sees the Net and email as a great promotional tool for new artists looking for work. "We get emails from new bands who want us to listen to their stuff to see if we would like them to play with us," he said.

Morrison noted that the Net supplies all musicians with an equal playing field. "You don't become established just by being online, but it allows you access to the same forum as those that are established and that has never been possible before."

The big problem is getting people to the site, he acknowledged. "You still have to get out and establish a name by doing gigs and seeking airplay on local radio, but a Web site is somewhere for people to find out more if they like what they hear."

And then there's the question of money. ChaosMusic's Doidge hopes more artists will make money now that the Net is being used in the

discovery of new artists. "The top 5% of artists make 80% of the profits," she said. "The Net will really help new artists make money. It will also help them in their negotiations with labels. If you can prove you have an online audience, you will have more power in the negotiation process."

## Label or no label

A number of established artists argue the Internet is the means by which they can free themselves from record companies and take back control of their music. Platinum-selling US rappers Public Enemy are one example, releasing their latest album via digital download after a protracted fight with their label over the use of MP3 material.

While some have played this as a battle for control, the majority of industry

players are calling for some realism. "It is not a case of evil monopolies stopping artists, and them having the opportunity to go it alone with MP3," said Festival's Fabinyi. "No-one could suggest that wholesale piracy is good for anyone."

"The Net is an opportunity for record companies to promote artists and products, but if we want our artists and composers to be recompensed, and to therefore continue making music, there needs to be a secure format. Those who create and invest in art should get a return for their efforts, or they will stop doing it, simple as that."

Morrison, who now has his own label, agrees. "As an artist I have no more wish for piracy than a label. I don't get a royalty payment either. You tend to find a 'them and us' mentality in the industry,

## Custard takes the Internet gravy train

Compared to most Australian musicians, the members of indie pop group Custard are well-versed in technological matters. Bass player Paul Medew led the charge. "I was the first to take an interest in computers, but we all have computers now. Before I knew it we were all sitting in the back of the Tarago reading computer magazines."

In the local music industry, Custard is regarded as an innovator in the use of the Internet to promote its music. It was the first Australian group to broadcast an album recording live on the Net (a project known as CustardCam). The band offered snippets of the songs from its new album online before it was released and is planning a live online concert.

"Some of this is a bit of a novelty and a gimmick for the moment — the technology and the bandwidth mean that video streaming often looks lousy — but it's a nice idea and it will get better," said Medew.

While some of this innovation has come from within, Custard's record company has also been pushing the group's technical education. BMG, which instigated CustardCam, understands the technology and encourages Custard in its online endeavours.

When APC spoke to Medew he was developing his first Web site, a user's guide to the bonus CD-ROM included with the group's new album. "BMG asked for a volunteer. I jumped at the opportunity — much to my regret sometimes. It is very time-consuming!"

Most artists don't know much about the Net, admits Medew. "It's certainly not rock, and it does have that geeky aura about it, but I think that's changing. More people are realising the benefits of the Internet as a creative outlet, and for commerce too."

Custard, however, does not sell any digital music on its site (<http://www.powerup.com.au/~custard>). "The concept provides artists with a great opportunity, but I find MP3 a little scary. The lack of security with the format is a problem and I wish people would be careful. It's going to come back and bite people on the bum before too long."

Selina Mitchell



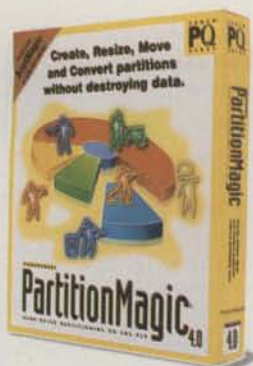


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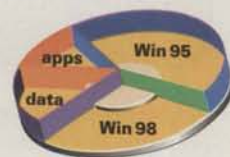


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## Playing around with the Mavis's

Many bands that don't have the time, inclination or knowledge are leaving the development of their Web presence to Internet-savvy music lovers. A fan of the Mavis's, for instance, asked the Melbourne pop group if he could develop a site for them, and they were keen to take up the offer.

"I am happy to leave it to someone else, but I think it is healthy and important to take an interest," said band member Matt Thomas. "These days you can't say I don't need to know that, I am an artist. It doesn't work that way. We were a bit ignorant about it a few years ago, but now we know enough to be involved."

The Mavis's site (<http://mavis-s.com/mavisfl.htm>) is focused on fun as well as information. There are links to movies, music and television shows that influenced the band as children, ranging from Olivia Newton John to *I Dream of Jeannie*, as well as the usual gig guide, song snippets and discography.



Commerce does play a part. "I don't think about it making money but I guess it would through the merchandise we sell," said Thomas. Nor is he concerned about the possible piracy of the Mavis's work. "Our music is copyrighted," he said simply.

Thomas is just starting to discover the Net and technology for himself as a creative tool. "I am getting to the stage where I want to expand my song writing and I am co-writing songs. Some of that is being done via email. I receive and send MIDI files that are crystal clear. For a long time I was very wary and scared of technology, but you can talk to people and create at your own pace using email. It gives you time to think things through."

With the aid of technology, it is easier for non-musical people to create 'music' and the Net is another way for that music to get a run, admitted Thomas, but he believes the good stuff will shine through. "Ultimately organic songs will be the core — I hope."

Selina Mitchell

downloads online is a tricky task. "Downloads are a great promotional tool, but at the moment all they do is build on CD sales," said Doidge. Chaos bought a Liquid Audio server in 1997 and was the first company outside the US to license MP4, but CD sales are still the backbone of the company. "We wanted to lead in this area, but in hindsight the market is just not ready yet."

Forrester research predicts that four elements will impact the growth of commercial music downloads: the size of the audience for digital music; the existence of technology to support mass-market interests; the availability of music from major labels; and the creation of distribution hubs to match content to buyers. A change in mainstream consumer behaviour will only take place once the download process is simplified, consistent across Web sites, and fast, Forrester predicts.

Technology companies and enthusiastic individuals will have some control over these four elements, but most of the control remains in the hands of record companies. The challenge they face is to demonstrate the advantages of digital music to the market.

"Whether we like it or not, we will get digitised music: there are too many advantages," said Morrison. "Most will find the convenience of clicking on a mouse and getting music great. Do they want everything that will come with it? I don't think they want the complexity. It is so simple now. You walk into a shop and you buy, take away and listen. People don't want to have to learn something new."

"That is the challenge to the industry. We need to help consumers feel comfortable with it. It's the same as when you talk to someone. If they don't understand you it is your problem, not theirs."

but we are co-dependent. One can't prosper without the other."

"Record companies deal with the production of goods. If you want to produce music that is commercially competitive, you need to refine the music and record it properly," said Fabinyi. "There is always an exception that proves the rule, but making a record is expensive and so is promotion. You get both with a label."

Shock's Caldas agrees. "Making good music is not as simple as buying a few machines and plugging them in. You need creativity, marketing and good quality equipment."

Those who are marketing alternatives are not convinced. "An artist doesn't need

to be signed anymore — they can make their own record," said Museek.net's James. "People are recording and pressing CDs for as little as a few thousand dollars. The only challenge is distribution and marketing."

## Moving on

Despite widespread hype for the digital music revolution, a major change is still some way off. Altering music-buying and listening habits is not a trivial task.

People who buy music from retail outlets still far outnumber those who download it from the Net. In Australia the market for downloaded music is marginal at best. ChaosMusic has found that selling

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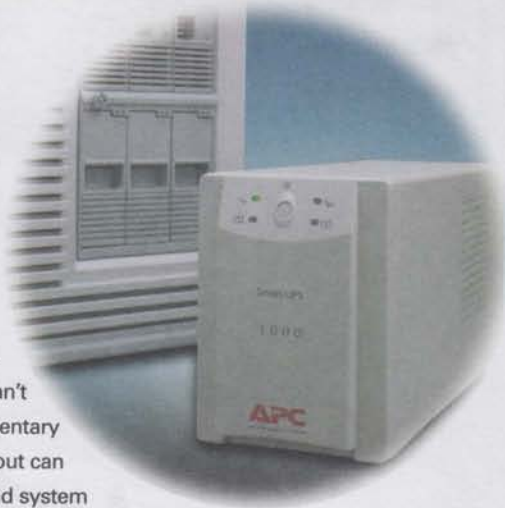
If you're keen to sample some online music for yourself, look no further than this month's [apcmag.cd](http://apcmag.cd), which includes a wide range of MP3 players and digital sound-editing systems. See page 10 for a complete list of programs.

For even more coverage of the digital music revolution, check out [apcmag.com](http://apcmag.com) for interviews with alternative band Pollyanna and virtual band Juju Eyeballs, as well as a guide to local sites that offer free downloadable music and much, much more.



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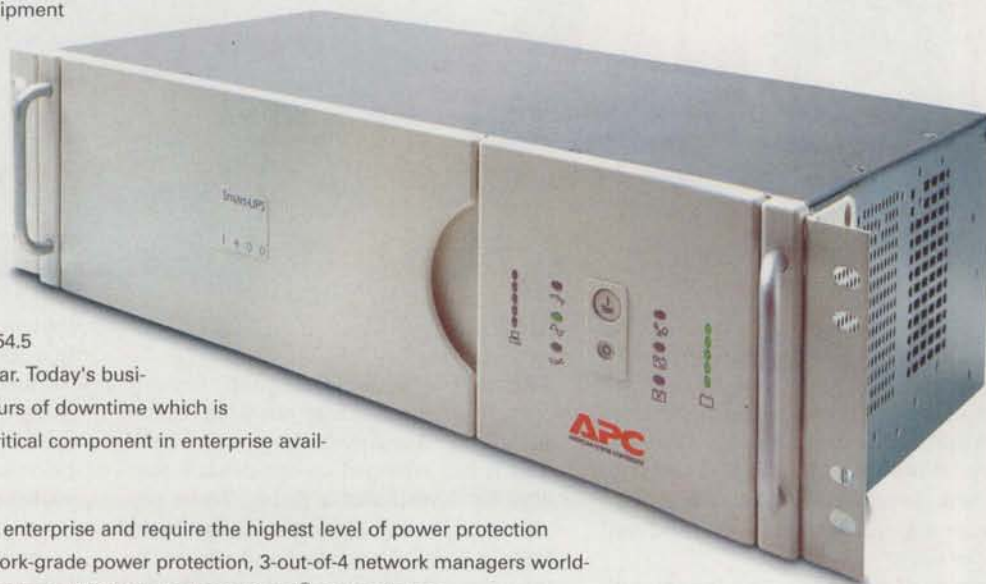
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**N**ow that you've read all about Internet audio, you probably want to dive right in and see what all the fuss is about. But you'll need some guidance to choose one of the many 'standards'. You'll also need to choose a player for the files, and it helps to know the advantages and disadvantages of each.

First, the size of a file and the amount of audio jammed into it can greatly reduce or increase the effectiveness of the Internet as a viable audio tool, although this is more applicable to streaming than downloaded files. Aside from the actual media quality, the speed of your Internet connection has a major impact. If you have a slow connection, you should not consider large file types such as MP3, VQF or WAV. Instead look at RealAudio or the new Microsoft Audio 4.0 files; these are smaller and capable of being streamed.

Another factor that affects the audio qualities is the codec (coder/decoder) used to create them and audio recording levels. Files created with more advanced codecs have better audio quality. Liquid Audio, a2b and arguably VQF have superseded MP3, which is the current mainstay of Internet audio, but they are yet to be taken up widely.

## WAV

The Wave file format, or WAV, is one of the oldest audio file types. They can be played by almost any player on the Net or any player installed with an operating system. A Wave file is a digital representation of an analog audio file; it doesn't use compression at all. Because of its simple form, a Wave file is very large, but is as close to the original audio as possible. A five-minute CD track would take approximately 50M of disk space as a WAV. With this length to storage ratio, it's not surprising that Wave files are used mainly for small sound snippets on the Web.

## MP3

Although MP3 (MPEG-1 Audio Layer-3) compression technology has been around since 1992, it is only in the past few years that it has emerged as the default standard for downloadable music. When people realised what could be achieved with MP3, a flood of encoders and players hit the market. MP3s have high audio quality and small file sizes. Anyone with a PC and a CD-ROM drive can create them from audio CDs, and there is no way to track



where or by whom the files were made.

For this reason, MP3 has become popular not only with music lovers and new artists, but also with music pirates. VQFs and RealAudio don't offer any piracy protection either, but VQF files require much longer encoding times, and RealAudio's sound is not on par with either. In contrast, both Liquid Audio and a2b feature complex watermarking and encryption features.

An MP3 encoded at 44.4kHz and 128kHz features impressive compression rates compared to native CD audio. They compress at a ratio of approximately 12:1. However, the compression used to encode these files is lossy (which means it reduces the fidelity in the finished product). MP3 uses standard compression as well as psychoacoustic models to reduce the file size: files have the sounds and audio waves

that we can't readily hear removed — the first 300ms after a loud noise, for example. Although the audio qualities of MP3 are close to that of the original, some find the sound difference noticeable. There is a distinct lack of depth and structure to the sound, although after a while most people don't notice.

Probably the most popular players for MP3s are Winamp and its sister MacAMP. The latest versions of both of these feature fully editable playlists, graphic equalisers and the ability to play many audio formats. Both are highly customisable and there are many plug-ins available for downloading off the Net. Both programs feature 'skins', which allow users to change the look and feel of the player using readily downloadable files (slipping on another skin). You can find them at <http://www.mp3.com/software/>.

## Liquid Audio

Liquid Audio is another form of lossy compression. However, the sound quality surpasses that of MP3 and it creates a smaller file. Like a2b, Liquid Audio uses the AAC (Advanced Audio Coding) codec to produce files. AAC is an alternative compression scheme developed for the MPEG-2 standard, although coders can also use audio layers 1, 2 and 3. Files encoded with AAC have much higher audio quality than MP3, almost equalling the original CD audio, and are about 70% of the size of MP3 files.

They do, however, require more CPU resources to decode. When the AAC specification was finalised, different encoders were developed from it. a2b and Liquid Audio both use AAC, and although the compression technique is similar, you can't play a Liquid Audio track on an a2b player or vice versa. Nor will they play MP3s.

Liquid Audio has some notable security features. The encoder for Liquid Audio is not available for download on the Internet, which means only those approved by Liquid Audio can create the tracks. Also, to garner a Liquid Audio file you must first





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download the player and then create a personal key which identifies and tags each download. The results are stored in Liquid Audio's database. Finally, the downloaded file is encrypted with a 56-bit DES and 512-bit RSA encryption including buyer/user watermarks. This ensures only the downloader can play the file. When you download the player from <http://www.liquidaudio.com/>, you must enter details to create a personal encryption key.

Aside from the sales and watermark information, the Liquid Audio file also contains song, artist and album information including pictures, lyrics, song lists and ordering information details. Click on a button and a single track or playlist can be decoded into analog form and written onto a CD via the Liquid Audio player. Although the file is now analog, the watermarks remain. Any pirate CDs created from this will retain the original purchase details allowing the file to be traced.

The Liquid Audio site and others affiliated with it provide users with free access to streamed music samples from CD, as well as entire downloadable tracks. You can listen to songs and then decide whether you want to buy the full CD or just one track. Each track costs about \$US1.50.

## a2b

a2b is an impressive music system developed by AT&T, which had a hand in developing the MP3 standard as well as the newer AAC codec. a2b has not been as widely adopted as Liquid Audio. Although it is claimed that a2b and Liquid Audio are identical, we found that the a2b samples did not sound as clear.

a2b audio's security and track information is similar to Liquid Audio. However, we found one drawback when using a2b: we had to re-enter our name and email address details each time we downloaded a file. This was unnecessary when downloading Liquid Audio files, as it accessed our Liquid Audio Passport each time.

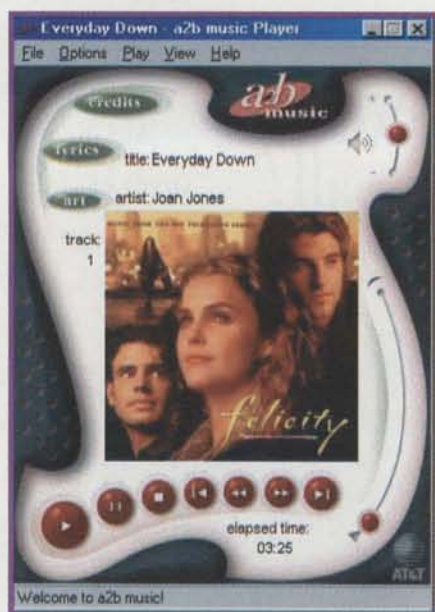
If you are looking for smaller file sizes and near-CD-quality audio, then you can't look past a2b. Go to the Web site at <http://www.a2bmusic.com/> to download the player and try a few samples for yourself. We didn't find the a2b player as user-friendly as the Liquid Audio player, but it does deliver better sound than MP3.

## RealAudio

RealAudio has gradually improved over time and it is the standard for streaming

media over the Internet. The audio quality has increased while the file sizes have shrunk. You won't find RealAudio files that are comparable in quality to MP3 or AAC-based files online, but for quick and easy streaming you can't look past this standard.

RealAudio files are very small, but the lossy compression technique means the sound quality is quite poor. However, high sound quality wasn't RealNetworks' main aim; fast, streamable and highly available content was. The audio quality is still quite passable for the file size, but it is well below the quality of other compression methods.



The best player for these files is RealPlayer G2, a player designed by RealNetworks to play and stream both audio and video. RealJukebox is merely a front end for RealPlayer G2. RealJukebox has the added benefit of being able to play audio CDs and MP3s as well as Wave files. Although its main purpose is playing RealAudio, other features make it a welcome addition to the desktop. The player also features links to download sites and servers which showcase new and popular talent. You can get all this from <http://www.realaudio.com/>.

## VQF

The VQF format from Yamaha uses TwinVQ compression technology from the NTT Human Interface Laboratories. It has some distinct advantages and disadvantages over MP3. First, the compression ratio is much greater than MP3,

which allows for smaller file sizes. Typically you can expect space savings of about 33% over MP3.

Although VQF fans claim that the format's audio quality is higher than MP3, there are just as many detractors. The distinction is made because the higher range notes have been kept when encoding VQFs; MP3 takes the edge off these notes, which can produce a dull sound at times. In some circumstances VQF provides a richer sound, but in the majority of cases VQF tends to sound somewhat flat. It's best to try out both before making a decision.

The pitfall with VQF, and the main reason why it hasn't become popular, is that its encoding times are markedly longer than those of MP3. When you consider that you can squeeze roughly 15 to 16 full CDs on one CD in VQF — compared to 10 to 11 in MP3 format — the benefits of Yamaha's standard are clear. Unfortunately, you won't find many VQF files on the Net at the moment.

The standard is relatively new, and there are not many VQF encoders or players available. Yamaha's own effort, the SoundVQ Player, is a no-frills player, but if you want style, try the K-Jöfol player. Both are available from <http://www.vqf.com/>, which also features skins for the K-Jöfol player and VQF plug-ins for Winamp.

## Windows Audio 4.0

Microsoft has also developed its own compression codec called MSAudio, which was mainly designed for streaming media. Released in mid-April, Microsoft claims it produces audio quality comparable to FM. Microsoft also claims that the codec offers MP3-equivalent audio using half the file size, something that not even AAC files can achieve.

We couldn't find a file using this new technology that lived up to these expectations. However, the compression factor is very impressive and the audio is almost MP3 quality. The format's streaming ability is also worth noting. Compared to RealPlayer G2, MSAudio files stream faster with better quality. As the standard is a relative newcomer, it has yet to be adopted by many companies. MSAudio streams directly through Windows Media Player, which is available as a free download from <http://www.microsoft.com/>.

Darren Ellis



# AGENT x86

In May, National Semiconductor announced it was exiting the PC processor business; the company plans to sell its Cyrix research team to Taiwanese chipmaker Via Technologies. Meanwhile, despite the ongoing popularity of low-cost PCs, AMD hasn't managed to turn a profit.

Is there any future in the processor market for a company that isn't Intel? Josh Mehlman investigates.

# REPORTING FOR DUTY

In 1997, National Semiconductor paid more than \$US\$50 million to acquire Cyrix, the third-largest player in the PC processor market after Intel and AMD. Rather than taking on Intel directly, National saw an opportunity to service the growing budget PC market, which it believed would not be attractive to AMD or Intel because of its low profit margins.

In hindsight, this was a misjudgment. "Not believing Intel would come after us in the low-end space was a mistake," National Semiconductor chairperson, president and CEO Brian Halla told the *New York Times* in May. "It doesn't make sense for us to slug it out with Intel... we don't have the resources."

According to the Dataquest report *And Then There Were Two: Cyrix Becomes Collateral Damage between Intel and AMD*, life was sweet for Cyrix while Intel and AMD stayed out of the budget market. Once AMD and Intel recognised opportunities in the low-end market, Cyrix's target moved quickly from \$US100 processors for \$US999 computers to \$US45 processors for \$US400 to \$US500 computers. Working on such low margins is dangerous for any company, but particularly for one — the Dataquest report notes — which is trying to fund research to keep up with Intel and maintain a leading-edge fabrication plant.

National Semiconductor executives said the price war between AMD and Intel made the industry unprofitable, but National had other problems at the time. The Cyrix MII was falling behind Intel's Celeron and AMD's K6-2 in clock speed and performance, which forced National to discount the price even further. It was also having trouble meeting the demand

for Cyrix processors. National's strategy was fundamentally flawed, according to Nathan Brookwood, analyst with research firm Insight 64. "If you want to compete successfully in this arena you need to have two design teams," he said. "Cyrix was spread too thin and couldn't compete with AMD and Intel in terms of technology."

## What about AMD?

While AMD has also struggled, it has managed to continue operating and there are some positive signs. This year's first-quarter financial results prompted AMD's chairperson and CEO W J Sanders to comment, "the best thing that can be said about the first quarter is that it's over". Second-quarter figures were even worse than analysts expected.

According to another Dataquest report, *AMD Struggles with Intel's Moving Target*, the company's declining revenue can be blamed on design limitations of the K6-2, which was never intended to go as fast as 400MHz. Due to delays in the Athlon (formerly codenamed K7), which was expected in the first half of this year, AMD has kept pushing the K6-2 faster. However, it has been harder to produce a processor capable of such high speeds, and as a result yields are down.

AMD has captured a significant share of the mobile market. Major notebook manufacturers, including Compaq and Toshiba, are building consumer and small business notebooks around the K6-2. In June, AMD released the mobile 380MHz K6-III P, which has 256K of level 2 cache integrated in the processor chip. Intel soon fought back, releasing the 400MHz mobile

Pentium II, which also has an integrated cache. It is the first x86 chip to be manufactured using a 0.18-micron process, allowing manufacturers to fit more elements on a chip. It also reduces power consumption and manufacturing costs.

Sanders said the company needs to get its average selling price per unit (ASP) above \$US100 in order to survive. According to the *Microprocessor Report*, AMD's current ASP is around \$US60, while Intel's is over \$US225. Even though nine of the global top 10 PC vendors have at least one model containing an AMD processor (Dell is the exception), the marketplace continues to regard AMD as a purely low-end solution, a view AMD is determined to change.

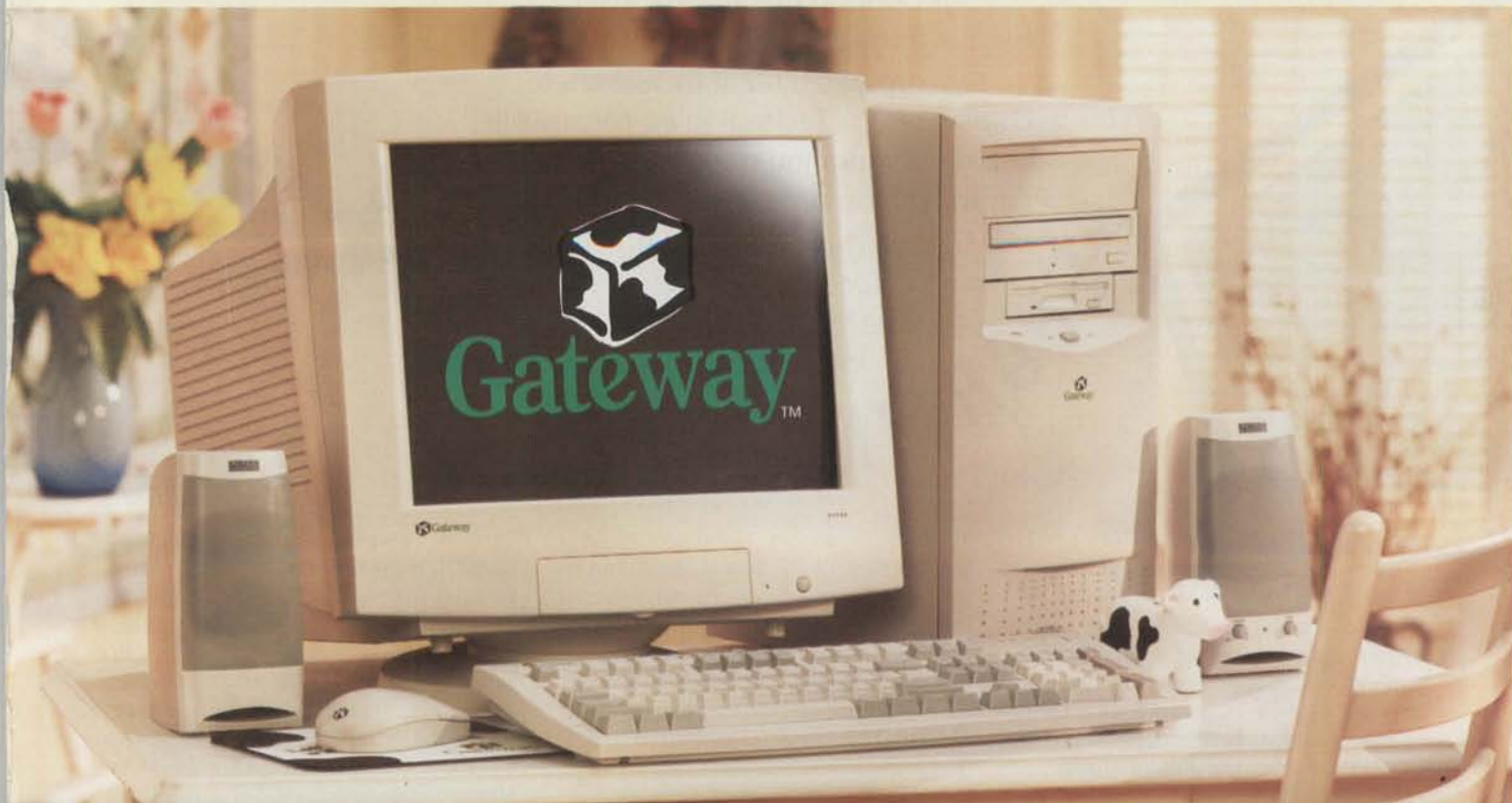
AMD is gambling a great deal on the Athlon, which should be appearing in systems in limited volumes by the time you read this. The Athlon is a radical departure from previous AMD processors. AMD decided to abandon the Super7 bus, which at best can only lag behind Intel's P6 bus, opting instead to license the Alpha EV6 bus from Compaq. This bus was designed by Digital for the Alpha processor, so it has many advantages for high-performance, multiprocessor systems. Intel's P6 bus runs at 100MHz and will make it to 133MHz when the Camino 820 chipset is released later this year. But the EV6 bus runs at 200MHz or more.

The Athlon also has design features optimised for very high clock speeds. It has a 128K level 1 cache, four times that of the Pentium III and a programmable level 2 cache of up to 8M. In addition, it has three integer execution units and three multimedia (floating point) execution units. This does not necessarily mean

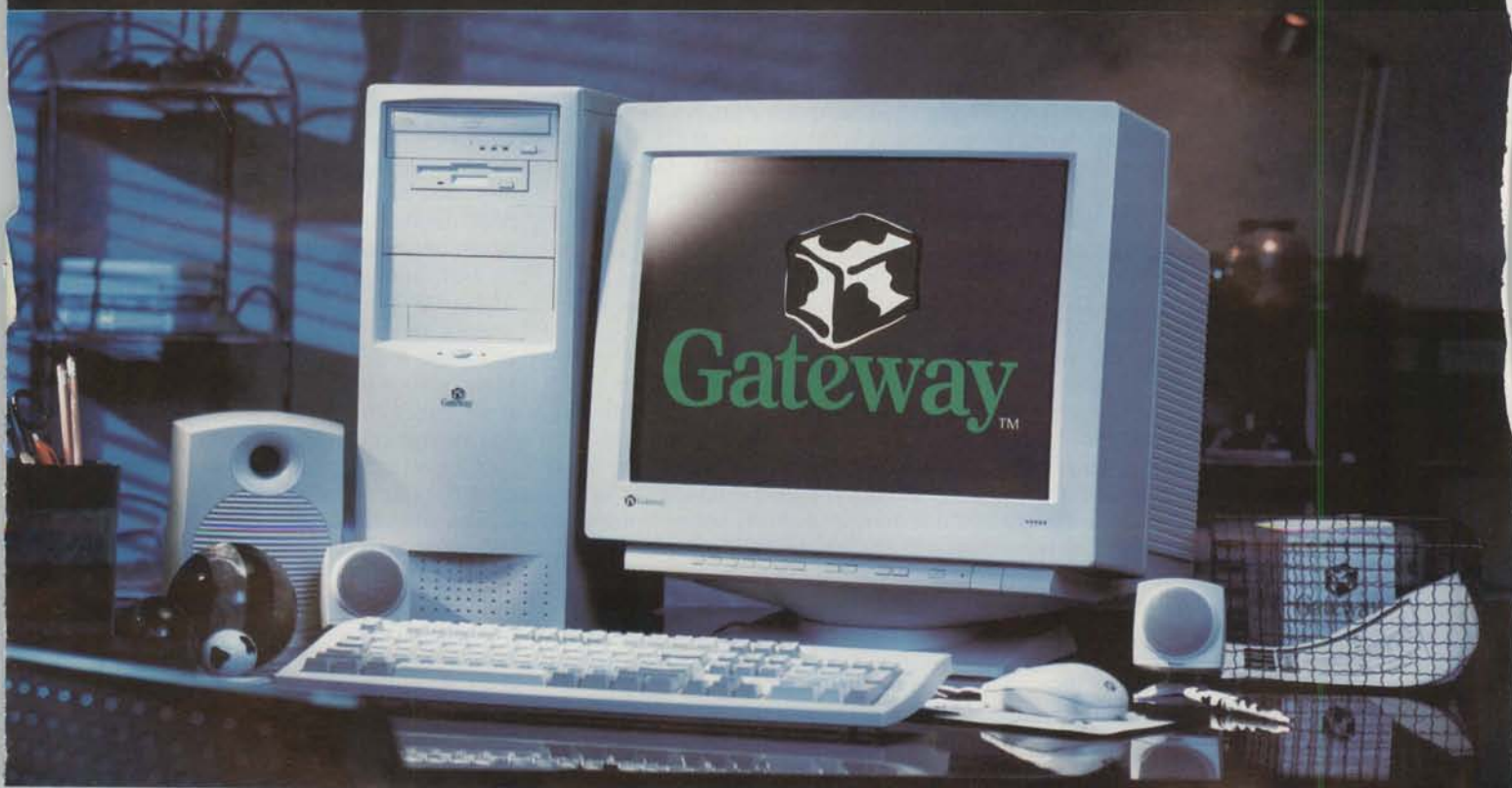


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the Athlon will be 1.5 times faster than the Pentium III, which has two integer units and one floating point unit. Having parallel execution units can only be helpful if one calculation is not dependent on the result of the previous one. However, AMD is betting that multimedia applications have enough parallelism to make additional execution units beneficial.

AMD has also included an enhanced version of the 3DNow multimedia instruction set in the Athlon in order to reach better feature parity with Intel's SSE instructions in the Pentium III. This includes 19 Single Instruction Multiple Data (SIMD) instructions and five digital signal processing (DSP) extensions, which will assist in decoding multimedia files and communications algorithms.

The initial release of the Athlon will have 512K of level 2 cache running at half the clock speed, similar to the Pentium III. When AMD switches to a 0.18-micron process later this year, the Athlon should include an on-chip level 2 cache running at full processor speed, similar to the Xeon. AMD's core logic chipsets will support PC100 and PC133 SDRAM and Direct Rambus DRAM.

Although no independent results were available at the time of writing, tests performed by AMD gave the Athlon a 5% to 15% advantage over Xeon in SPECint, a 35% to 40% advantage in SPECfp and a 40% lead in Ziff-Davis' 3D WinBench. Athlon will sell at prices very similar to the Pentium III. However, AMD still faces some major challenges.

The first is finding partners to build motherboards for the Athlon. Because of its EV6 bus and unique Slot A connector, any potential partner may be reluctant to produce for the Athlon. AMD is cur-

rently producing its own single and multi-processor chipsets, while Via Technologies and Acer Laboratories will produce single-processor chipsets once the Athlon becomes more established.

If the Athlon is perceived as a better deal than the Xeon in terms of price and performance, AMD should have no trou-

ble. But if not, it will be competing with the Pentium III, which already has very good motherboard support, and AMD will have a lot of trouble getting motherboard manufacturers to come on board. AMD announced it already has five motherboard vendors on board, including Asus, FIC and Biostar.

## Buy buy Cyrix?

Before Via's surprise buy in June, most analysts didn't think National would find a buyer for its Cyrix team. "If National Semiconductor couldn't turn Cyrix into something successful, it's unlikely anyone else will buy it," IDC analyst Graham Penn told APC. However, Gartner Group principal analyst Ian Bertram argued that emerging technologies present new opportunities and there still is a big market for low-end processors.

Via was not even among the rumored pool of buyers, a group which included IBM, STMicroelectronics and Texas Instruments. However, Via did meet the two essential prerequisites listed by Insight 64 analyst Nathan Brookwood: cross-licensing agreements with Intel and sufficient resources to take on Intel. Intel is in fact currently suing Via over those licensing agreements. Via will also continue to produce chipsets for AMD's Athlon processor, claiming that AMD and Cyrix should be complementary.

National is keeping some Cyrix technology: the MediaGX, an integrated processor, graphics and sound chip. It was initially intended as a processor for low-end PCs, but according to the Dataquest report, National now intends to focus on Internet appliances, set-top boxes and

thin clients. Internet appliances are something of a wild card, the report states. While there may be a market for \$US100 to \$US300 Web appliances, no one is sure how quickly it will develop.

In good news for National, AOL-TV in the US recently announced that one of the two designs chosen for its set-top boxes is made by Philips and based on the MediaGX. Previously, most set-top devices have used non-x86 processors. Intel, AMD and National say it makes sense to use an x86 processor because of the availability of software and development tools, but a \$US25 processor is an expensive component for such appliances. Most developers of purpose-built set-top boxes haven't seen the need for the software compatibility of x86 processors, relying instead on light, fast RISC chips unburdened by backward compatibility.

Undeterred, Intel and AMD have both announced plans to introduce an integrated chip next year. Intel announced its Timna system-on-a-chip device, which will contain a Celeron processor core, a graphics unit and a memory controller. AMD is taking a slightly different approach, eliminating some of the functionality of the processor core of its integrated device.

## Processor war timeline

	Recent developments		Q3 '99		Q4 '99				
Mobile	AMD K6-III P 350, 366, 380 MHz	Intel Mobile Pentium III 400MHz 0.18 micron	Intel Mobile Celeron 400MHz		AMD K6-III P 0.18 micron	Intel Mobile Pentium II 400, 450MHz	Intel Geyserville chipset		
Desktop	AMD Athlon 500, 550, 600MHz		Intel Camino chipset 133MHz FSB Rambus RAM Ultra ATA/66, 4x AGP	Rise mP6 II 400MHz 0.18 micron	AMD K6-III and Athlon 0.18 micron	IDT WinChip 4 400 to 500MHz	Intel Celeron 500MHz	Intel Pentium III 550, 600MHz Socket 370	Cyrix MII 466 0.18 micron
Server	Intel Pentium III Xeon 550MHz		Intel Carmel chipset 133MHz FSB Rambus RAM 4x AGP, up to 4G of RAM	Intel Profusion chipset Up to 8 Pentium III Xeon processors	Intel Pentium III Xeon 600, 677MHz 0.18 micron				



If AMD's performance figures are accurate, it will have less of a struggle convincing major vendors to adopt the Athlon in high-end desktop systems. (IBM was the first to announce an Athlon-based system called the Aptiva S. Compaq and Gateway are expected to be close behind.) If the fastest PCs in the world are built with an AMD processor, it will change the position of the company, said Brookwood. This will initially have the greatest impact in the high-performance PC space, followed by the server space.

AMD's uptake in the server market is likely to be gradual. For one thing, its chipsets do not yet support SCSI, large amounts of memory or error-correcting memory, which are essential to a server system, said Brookwood.

Even if the Athlon performs as well as expected, AMD still has to prove it can manufacture the processor reliably and meet demand. AMD's manufacturing problems caused shortfalls in the supply of the K6-2 and are the most likely reason for the delayed release of the Athlon.

## Anyone else?

Even though AMD is looking to the high-end market to get out of its financial doldrums, and Cyrix was unable to turn a profit in the low-end market, several other competitors are stepping up to take the challenge. IDT manufactures the WinChip family of x86 processors. Technologically, IDT is usually a few steps behind Intel and AMD, but its processors are at the very low end of the price scale.

IDT is planning a new model before the end of this year, the WinChip 4, which will run at 400 to 500MHz. Early in 2000, IDT wants to switch to 0.18-micron production and increase the speed to

600MHz. However, like Cyrix, IDT is struggling with low margins. "Looking for a partner" may prove difficult.

Rise Technology, on the other hand, is optimistic about its future. Rise produces the mP6 range of processors, which so far has not attracted a lot of attention or sales. Since Rise has the largest die size of all the x86 processors, it's hard to compete on cost when it has the most expensive component, said Brookwood. However, in the next few months Rise is set to switch to 0.18-micron production, reducing the cost and size of its processors. The new chip is also likely to fit in the same 370-pin Socket 370 slot as Intel's Celeron processors, as will Cyrix's planned Gobi processor. Although Rise lags behind Intel and AMD in terms of speed, its mobile processors consume much less power.

## And now for Intel

Intel is taking its competition very seriously. When the market demanded a low-cost, lower-performance processor Intel provided the Celeron, but didn't promote it aggressively. While AMD and Cyrix remained content with the lower end of the market, Intel was happy to leave them there, states a Dataquest report, *Intel Fights Back at the Bottom End?*. Intel has consistently favoured profitability over market share, especially while its competitors faced too many internal difficulties to present a serious threat.

When AMD and Cyrix gained popularity in the sub-\$US1,500 space, this started to bite into Intel's more profitable Pentium II markets, forcing Intel to take notice. Intel is strongly promoting the Socket 370 Celeron processors even though the lower-margin Celeron is starting to cannibalise sales of the higher-margin Pentium II.

In June, Intel dropped its processor prices substantially. Some industry sources accused it of using profits from the Xeon processors to fund a price war. As only Intel is in the black, this strategy certainly appears to be working. However, Penn believes Intel is making money from the Celeron and has an interest in keeping smaller competitors alive; it doesn't want to be accused of predatory pricing or monopolistic practices.

Intel's 820 Camino chipset has been delayed until at least September. Camino will feature a 133MHz memory bus, 4x AGP, an Ultra ATA/66 disk interface and Rambus DRAM. The switch to Rambus memory is a controversial one. According to Brookwood, Intel is trying to drive the market to Rambus. Brookwood believes the economics of Rambus as a mass-market product are questionable; Rambus memory is difficult to manufacture and there is resistance to the switch. Some chipset manufacturers, most notably Via, are pushing PC133 memory over Rambus.

Intel will stop producing desktop Pentium II processors by October and the mobile Pentium II will join the scrap heap by the end of the year. Intel's Coppermine chip (a 0.18-micron version of the Pentium III with a 256K on-chip cache) has been delayed until November, which can only benefit AMD.

Further ahead, Intel expects to release its Merced chip mid-2000. Although it will be based on an entirely new 64-bit instruction set, Merced will be able to execute x86 instructions natively via a hardware translation unit. It is rumoured Intel plans to revamp the x86 instruction set for a new 32-bit processor codenamed Wilamette, due at the end of next year.

Q1 '00

Q2 '00

Q3 '00

Q4 '00

AMD  
Mobile Athlon  
(unconfirmed)Cyrix Gobi  
Cayenne core  
256K on-chip  
cache  
Socket 370Intel Coppermine  
Pentium III  
600MHz  
256K on-chip cacheRise Tiger  
mP6 II  
466MHz  
Socket 370IDT  
WinChip 4  
500 to 700MHz  
0.18 micronIntel  
Pentium III  
667MHzIntel  
Celeron  
500MHz+Intel  
Pentium III  
650MHz  
Socket 370Intel  
Pentium III  
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instruction setIntel  
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instruction set





# Spinning

# webs

Making your presence felt on the Web is now more essential than ever before. Whether you're an HTML guru or a programming novice, there are tools to help you build a Web site that will stand out. APC tests 10 tools that can get you on the Web.

By Alex Kidman and Josh Mehlman

**W**hen Web site development tools appeared on the market in 1995, Web site creation was best left to programmers. Most Web authors wrote their own HTML code and the first development tools made it easier to write and edit code. About a year later, as the Web began to gain popularity, less-experienced Web developers demanded something a little less daunting. As a result WYSIWYG (what you see is what you get) — a concept that originated in desktop publishing tools — came to the Web.

Since then, little else has changed. Web tools have kept up with advances in technology, but the basic concepts have stayed the same. Many professional Web programmers still write their own code, which explains why there are still code-only HTML editors like Sausage Software's HotDog. To be useful, this kind of editor should format your code so it's easier to read. It should also have lots of shortcuts to reduce the amount of typing required, syntax checking to spot mistakes, and as much help as possible on HTML.

There are also packages that are code-based but have a WYSIWYG editing mode tacked on, such as Allaire HomeSite. The largest category, however, is tools that offer a pure WYSIWYG interface and protect you from coding complexities, such

as FrontPage and Dreamweaver. However, almost all of these WYSIWYG editing tools still allow you to edit code manually if you choose.

There are two schools of thought in the development of WYSIWYG Web tools. Most retain the HTML text-based flow of the page and let you place items within the constraints of HTML (such as Symantec Visual Page). Others, like NetObjects Fusion, let you place items anywhere on the page and they calculate tables or DHTML code for you. Only a few of the top-end packages, such as Macromedia Dreamweaver and Adobe GoLive, let you do both.

Either way, a good WYSIWYG Web tool is one that lets you keep things as simple or complex as you like — whether you're just putting text and pictures on a page or adding mouseover effects and layers.

## The reviews

We reviewed 10 of the major low-end and mid-range Web site tools, appropriate for developing personal and small business sites. While they could also be used to develop front-ends to larger, database-driven sites, we steered clear of database integration and Web application development tools, as these require a whole review themselves. One such program, ColdFusion 4, is reviewed in First Take (see page 32)

In order to test Web development tools, we first attempted to build a sample site, based around an online catalogue for a hardware shop. This included the use of frames, tables, feedback forms, images and if possible layers and mouseover events.

We considered the features each package supported, and their ease of use. A modern Web editor should be able to do more than just throw together simple code and we wanted to see how far Web packages had evolved.

We then examined the output code and checked how well it appeared in two major browsers: Netscape Navigator 4.5 and Internet Explorer 5. It is naive to assume that a site will only be seen in one browser and many packages don't take this into consideration.

We also imported several externally created sites into the packages to see how they resolved the features within these sites and how they rewrote them. End code was again checked to see if the packages had modified them or corrected bad coding.

If you're planning to import an existing site using your new software, it's important to know if the package will cope with your existing code, or if it will mutilate it to the point that you would be better off starting from scratch.



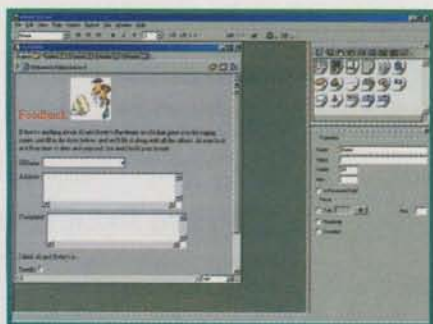
## GoLive 4.0

Adobe

Adobe has subscribed to the common industry motto 'if you can't make a great product, buy one'. Since Adobe PageMill was not exactly hot stuff, Adobe bought GoLive Systems to add its high-end CyberStudio product to its range of Web tools under the GoLive name.

GoLive 4.0 is a very slick piece of software for mid-range to professional users. It takes a little getting used to, but once you get going, there are no limits to what it can do. It is similar to Macromedia Dreamweaver, although you can't select and modify multiple objects at the same time, which can be a little tricky.

Like many Web tools, GoLive splits the design into a site layout and a page layout. The site layout tile is unremarkable, except for its lists of colours and fonts used in the site, which are great for maintaining the overall look and feel of a site.



The page layout is quite unique. Like Dreamweaver, it has a series of palettes from which you can drag objects into the page. These palettes are separated by category tabs. Neither the objects nor the tabs have text labels, although the name of each symbol shows up in the status bar when the mouse is over it. It takes a while to get used to what each tab and symbol represents.

The page layout has five views: WYSIWYG editing, frames, source code, preview and outline. The outline shows you the HTML code in an expandable and collapsible outline format. You can click on each tag to add new options. For experienced coders, this is a very convenient way to edit your code.

Netscape didn't always like the way GoLive did event scripting, but aside from this, our pages rendered the same in Netscape and IE.

Josh Mehlman

**Distributor** Adobe  
**Phone** 1300 550 305

**Online** <http://www.pacific.adobe.com/>  
**Price** \$545  
**In short** A very stylish high-end Web site tool, although a little quirky.

## PageMill 3.0

Adobe

Adobe is in the odd position of currently selling two competing HTML products, GoLive and PageMill. GoLive is all glitz and glamour, while PageMill is less spectacular. This is not to say it's a bad product, it just lacks a lot of the bells and whistles of the high-end products reviewed here.

It uses all of the basic tools you would expect from a WYSIWYG Web editor to good effect. It produced reasonably clean code, although it did have some problems creating borderless frames that work in both IE and Netscape. The emphasis here was definitely on keeping things simple for HTML novices. Checking existing code produced few errors and it made few changes to existing files when saving.

For some reason, it insisted on making broken links into images of the Mona Lisa; obviously someone at Adobe has a sense of humour. PageMill handles frames with grace, allowing in-frame editing and intelligently identifying frames when saving, both by name and by a demonstration graphic which shows where the frames reside in the frameset. Tool layout is consistent and pleasantly easy to follow, although it does use an annoyingly bland property inspector for object editing.



Project management follows the standard setup of directories and linked flowcharts, along with inbuilt FTP options, including pie charts of estimated download times. PageMill ships with 10,000 images and a copy of Photoshop LE — although Adobe ImageReady would probably be more useful.

The test site we produced using PageMill was a reasonable size, comparable with other products, although it did refuse to load one of the externally coded pages, and crashed each and every time instead.

Alex Kidman

**Distributor** Adobe  
**Phone** 1300 550 305  
**Online** <http://www.pacific.adobe.com/>  
**Price** \$179  
**In short** Fails to stand out from the crowd.

## HomeSite 4.0

Allaire

As well as being available as a standalone product, Allaire HomeSite comes packaged with Macromedia Dreamweaver and NetObjects Fusion. As with most free things, there's a very good reason it's being given away.

Perhaps that's a bit harsh. Aside from a bug that occasionally wipes over the contents of one page with another, the awful handling of frames and tables, and the incredible inconsistencies between the various editing modes, it's not a terrible product.

One of the aspects which makes HotDog so good is it sticks to its core competencies. Like HotDog, HomeSite is a very good HTML editor for those who want to edit their own code. But HomeSite's WYSIWYG edit mode seems to have been tacked on at the last minute and would be of little help to unexperienced HTML programmers.

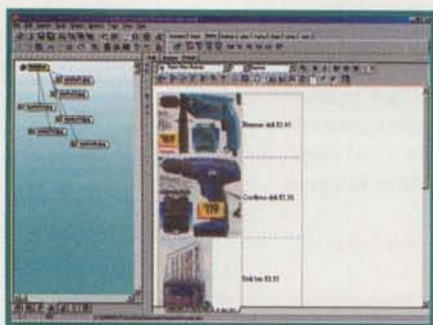
If you're coding manually, HomeSite has some terrific features. When you start to type in a tag, it pops up lists of options. It also remembers to put in quotation marks and closing tags for you, checks the syntax of your tags on the fly, and warns you if there are errors.

HomeSite's interface is very similar to HotDog's, although it can't be customised to the same extent. It has wizards to create things like frames and tables, although these are not all that flexible and it's very difficult to edit frames and tables once you have created them.

There is very little HomeSite doesn't 'support', although we couldn't find a way to add HTML 4.0 layers. HomeSite allows you to add event-based custom scripts, and even to integrate databases using ColdFusion or ASP. Of course, you have to write all the code yourself, but at least it puts in a few helpful tags.

Josh Mehlman





**Distributor**  
**Phone**  
**Online**  
**Price**  
**In short**

Firmware Design  
(02) 4721 7211  
<http://www.allaire.com/>  
\$180  
Some nice features for DIY coding, but otherwise avoid it.

## Home Page 3.0

FileMaker

FileMaker (formerly known as Claris) is evidently seeking the ease-of-use market with Home Page, targeting users of its main product, FileMaker. Home Page uses a fairly standard WYSIWYG interface.

Most steps in the page creation process can be automated to guide the user.

[www.smh.com.au](http://www.smh.com.au)

There are assistants within easy reach for virtually every task. This is actually quite a blessing, because the main page creation tools are fairly kludgy and uninspiring. Home Page's setup for frames is slow. It is also set up badly for editing individual frames — three separate mouse-clicks are required before the pages are launched as new windows.

As with a lot of the other packages reviewed here, Home Page supports extra HTML options such as DHTML and JavaScript, but only in the sense that you



can set up dialog boxes to paste in pre-written code. The written code is fairly clean and came in at about the same size as other test sites, but performed particularly badly across browsers. In Netscape,

scroll bars came up in areas where they should have been prohibited, while in IE 'borderless' frames had a definite border. Re-editing could do little to shake them, no matter how many times the 'show border' checkbox was deselected. To make things even more confusing, there appeared to be no options to set resizable/set frames; code for these had to be added manually.

Home Page is a good choice if you've got a lot of FileMaker databases that you want to get up on the Web quickly. Not all that surprisingly, FileMaker is the preferred database option for Home Page, and the program has a large number of form setup options that revolve specifically around querying FileMaker databases. Home Page includes its own FTP options for 'publishing' sites, but these are as simple as possible — the only configurable parameters being FTP addresses and passwords.

Alex Kidman

**Distributor**  
**Phone**  
**Online**  
**Price**  
**In short**

Dataflow  
1800 656 875  
<http://www.claris.com/>  
\$149  
Avoid unless you've got a lot of FileMaker databases.

**The Sydney Morning Herald**  
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## Dreamweaver 2.0

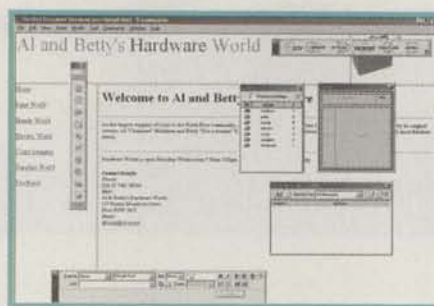
Macromedia

Dreamweaver is the Web tool of choice for APC's reviewers and Web site staff, and it's not hard to see why. Nothing can rival Dreamweaver for sheer power. On the other hand, Dreamweaver doesn't have many pre-prepared elements, so you will need to do more work to make attractive pages than you would using Fusion or FrontPage.

Dreamweaver's interface draws a lot from Macromedia's multimedia and graphics heritage. Like Adobe GoLive, it has objects you can drag from palettes to the Web page and a series of palettes to adjust the settings of the object you're working on. The properties palette is the most comprehensive and powerful of all the products we reviewed.

There are also palettes to adjust frames, layers, behaviours and more. You end up having quite a few palettes open at the same time, but they're extremely powerful because they allow you to adjust multiple objects, frames, layers or behaviours at the same time.

This was the only package we saw that could handle complicated concepts like



performing actions across different frames on the same page. It was also one of only a few that allows you to edit pages within a frameset. In our sample Web site, Dreamweaver produced very tight, clean code and had no trouble importing Web sites, including those with JavaScript.

The Windows version uses a very Mac-style interface. Unlike many of the packages we reviewed, Dreamweaver's palettes all float above the page, and can't be docked to the sides of the window. Things get a little cluttered unless you work at a resolution of at least 1,024 by 768 and it can be a little confusing at first.

Dreamweaver's colour selection tools are well-designed. A large palette of colours pops up from the control palette,

and you can drag colours to the object you want to adjust. There's also an eyedropper tool to match colours from graphics or other parts of the page.

Josh Mehlman

**Distributor**  
**Phone**  
**Online**

Firmware Design  
(02) 4721 7211  
<http://www.macromedia.com/ap/>

**Price**  
**In short**

\$569  
A great product — the best we've seen.

## FrontPage 2000

Microsoft

FrontPage has a bit of a mixed reputation. Coders tend to hate it with a passion, but it has a large crowd of devotees who enjoy its simple graphical interface and interoperability with other Microsoft Office products. FrontPage 2000 ships with the premium version of Office 2000 and this is the version APC assessed.

It looks as though little has changed on the coding front in this latest version of FrontPage. FrontPage still writes pretty horrible code, which at times seems to

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work despite itself. The code worked better in IE than Netscape, but the differences were slight. Where the code bloat was more worrying was in the extra size it generated — the test site created under FrontPage was a good 35% to 40% larger than other created test sites.

The flip side of this is that Microsoft has gone all out to include many features in FrontPage, and automate them as much as possible. Thankfully, FrontPage 2000 includes the site and page-editing views in the same screen, rather than irritatingly separate as in previous versions. FrontPage handles standard HTML elements with ease, and, to the joy of some, uses the standard Office interface to do it. This gives it an immediate accessibility, although its interoperability with other Office products isn't as impressive as it once was; a lot of products now include Word and Excel file filters as standard.

The inclusion of all these features does have its downside; it can be a chore to work through menus to find specific features. As an example, you can select



frame resizing and scroll bars through one menu, but must use another preferences menu for frame borders. FrontPage will accept code pasted directly from IE, but not Netscape. FrontPage is a good editor for anyone who doesn't care much about background details, although code junkies will be alternately bemused and horrified by the way it renders code. Considering FrontPage's features, it's the best HTML editor you can get in its price range.

Alex Kidman

**Distributor** Microsoft  
**Phone** 13 20 58  
**Online** <http://www.microsoft.com.au/>

**Price** \$199; upgrade \$109  
**In short** Horrible code saved by a good set of features and low price.



## Fusion 4.0

## NetObjects

When NetObjects Fusion first came out, it introduced a new paradigm in HTML editing. Most Web site editors tried to stay within the limitations of HTML, which is essentially text-based. Fusion essentially said, 'Stick whatever you want wherever you want on the page and let me sort out the code. You don't need to know any HTML at all.'

Fusion 4.0 achieves this by creating enormous, complicated tables or HTML 4.0 layers. Either way, the code ends up very bloated. And Fusion won't allow you to edit the HTML code, since it only produces the code once you publish the site to your Web server or local drive. Consequently, Fusion 4.0 is rather inflexible, but it does make it easy to create great-looking Web sites in a lot less time.

Fusion isn't fond of frames. Instead it prefers its own concept of master borders — it generates the same borders for each page and the repetition makes the code even larger. Microsoft FrontPage has a similar concept, but FrontPage also has better support for frames.

Fusion has quite a few automated components, which make it very easy to put together snappy sites. For example, its Dynabuttons feature lets you create button menus, and submenus if necessary, to navigate around your site. You can just as easily create ad banners, site maps and screen doors to divert to different pages depending on which browser the viewer is using. Fusion has a wide range of colourful page themes and it doesn't have to render the pages until you publish them.

Fusion 4.0 did awful things to the sites we tried to import, so if you're planning to import an existing site, look elsewhere.

Josh Mehlman

**Distributor** Firmware Design  
**Phone** (02) 4721 7211  
**Online** <http://www.netobjects.com/>

**Price**  
**In short**

**\$569**  
Quickly create great-looking sites without knowing a single HTML tag.

## HotDog Pro 5.5

### Sausage Software

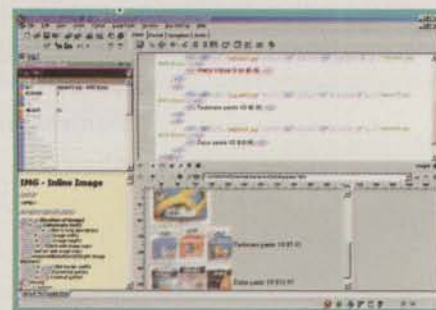
HotDog was one of the first Web editors to hit the market. It turned Melbourne-based Sausage Software into a world-famous company in the Great Web Hype of 1996 to 1997. HotDog has resisted the temptation to go WYSIWYG and its developers have focused on improving ways it can assist you in writing your own HTML.

Consequently, if you're going to use HotDog, you need to know how HTML works. You need to know a lot about the tags and you definitely need to know where to put them, because HotDog will put them anywhere you tell it to.

A lot of thought has gone into designing the interface so it is easy to use. Its three-pane interface consists of an HTML editing window, a preview window and a resource manager panel. You can add or remove 'resources' such as the Web site manager, HTML property sheet, multiline clipboard and macro editor, and they appear as tabs within the resource manager.

The HTML property sheet is a terrific resource for serious coders. It automatically adjusts itself to whichever tag you are editing, and presents you with a list of all the options for that tag, which you can edit by entering values or using pull-down menus. At the same time, the bottom half of the property sheet gives you detailed explanations of the tag and how it works, including hotlinks to the HTML standard guidelines.

Building the test site with HotDog took longer than expected. The interface may be well-designed, but it isn't the easiest program to use when starting from scratch. Its handling of frames is particularly kludgy and inconsistent. But because it's a code-only editor, its pages render well





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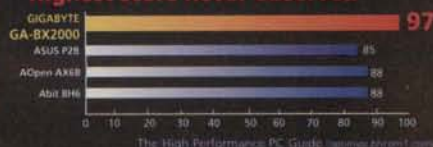
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in both IE and Netscape, and it doesn't make any changes to imported code.

**Josh Mehlman**

**Distributor** Sausage Software  
**Phone** (03) 9662 2627  
**Online** <http://www.sausage.com.au/>  
**Price** \$US129 (standalone)  
**In short** Excellent for raw coding.

## HoTMetal Pro 5.0

**SoftQuad**

HoTMetal Pro is a coder's dream and, despite the encouraging blurb on the back of the box, a new user's nightmare. While it supports the insertion of virtually any Web-compatible technology, you are generally required to know what they're doing from the start. The result is a flexible program that is a lot of fun to use — providing you know what it is you want to do.

HoTMetal Pro provides the usual switchable views between WYSIWYG and code, although its WYSIWYG interface is less friendly than those of products such as PageMill or FrontPage 2000. Conversely, its code side is excellent. HoTMetal wrote consistently clean and understandable code, and produced an extremely compact test site. With this strong code focus, it came as no surprise that the test site rendered virtually identically in both of the major browsers.

Attributes are tracked as adjustments are made, and while HoTMetal won't dynamically write JavaScript or DHTML, it does allow it to be pasted in or even dragged and dropped. For most elements, descriptive help is displayed under the attributes window, although these are usually more a reminder of acceptable values, not in-depth HTML tutorials. In keeping with its no-nonsense style, items such as flowcharts are generated in a fairly low-key style.

There were a few snags creating the test site in HoTMetal, mostly due to the way it generates frames. HoTMetal doesn't allow for dynamic frame updating; instead it launches separate windows for individual

frames. The appearance of objects (most notably fonts) within those pages varies from their final frame appearance, and it becomes a virtual necessity to preview the page after almost every frame change. HoTMetal handled imported code well and was able to check it for errors, pointing out elements, which may not be supported by all browsers; a very handy facility for cross-platform compatibility. If you know what you're doing and need a common set of tools to do it, HoTMetal is a good choice.

**Alex Kidman**

**Distributor** Sustance  
**Phone** (08) 8234 6248  
**Online** <http://www.softquad.com/>  
**Price** \$169  
**In short** Clean code, but not exactly friendly to new users.

## Visual Page 2.0

**Symantec**

Symantec Visual Page is a no-nonsense WYSIWYG HTML editor. All the usual tools are available within a fairly standard layout and there are a few neat touches. Unlike a lot of the other Web tools we reviewed, Visual Page uses its own previewing utility to check sites, although thankfully it's fairly accurate in displaying the end product.

The test pages also rendered virtually identically in both Netscape and IE. Like many products in this review, extended HTML and Java is supported, but must generally be written in external applications.

Visual Page follows the common system of setting up a project on a local server, modifying it and then 'publishing' it on your Web server. Objects such as text files, Java applets or images can then be dragged onto individual pages. The standard approach of preview pages, code pages and WYSIWYG pages is used and there are open floating windows for toolbars and projects, allowing greater flexibility. Frames are easy to generate, but the first step involves putting in a vertical frame every time. Editing this out is a pain.

Visual Page's controls may be easy to use, but they're also uninspiring and there's a tendency to become very cluttered with toolbars. Like many of the products in this review, there's nothing particularly bad about Visual Page, just nothing all that spectacular either. In an effort to woo the ecommerce user, Visual Page comes with a book titled *Creating Commercial Web Sites*, which includes a bunch of fairly old shareware utilities. A real pity is that few of these work with Visual Page itself.

## Editor's Choice

### Macromedia Dreamweaver 2.0

#### Highly Commended Microsoft FrontPage 2000

It's hard to go past Dreamweaver. It does it all and does it better than any other package we reviewed. It was the only package that managed to build the test Web site exactly as we envisaged it, generating its own JavaScript and clean, easily edited code. It ties with NetObjects Fusion for first place in the price stakes, but its power justifies the price tag.

Although we're not fond of its infamous code bloating, Microsoft FrontPage offers the most features and user friendliness in the sub-\$200 range. It might not be quite as easy to use as the more expensive NetObjects Fusion, but FrontPage is the only package under \$200 that enables less-experienced users to build complex, decent-looking Web sites without having to learn HTML.

The code produced by Visual Page is clean and the built-in source editor marks out elements by colour, which is a nice touch. It adapted well to existing code, although for some reason it had problems rendering some of the tables in its preview mode. Visual Page would be a reasonable choice for the first-time user (especially considering the generally well-laid-out manual) but not for coders or those looking to squeeze the very last drop out of their Web sites.

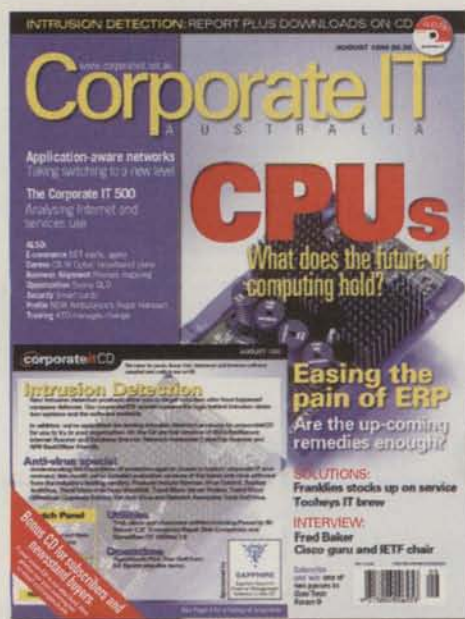
**Alex Kidman**

**Distributor** Symantec  
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**In short** Not the fastest tool around nor the most exciting.





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# WARNING:

## Strong graphical content

Competition is driving innovation in 3D graphics cards. With so many options, how do you choose the best one for your needs? APC Labs checks out 19 of the latest and greatest 3D AGP graphics cards. **By Darren Ellis**

**W**hen you compare the graphics card industry to the processor industry, huge differences emerge. In the past, competition was fiercer in the processor industry. A lot of new products came onto the market, driving innovation and growth. This phenomenon is much less apparent today, as there are arguably only two main competitors: Intel and AMD (see our processor feature, 'Agent x86 reporting for duty', on page 85 for more details).

However, the 3D graphics card market appears to be emulating the good old days of the processor industry. There are a number of 3D graphics card manufacturers of note, including 3dfx, ATI, Intel, Matrox and nVidia. Tight competition, along with general advances in accelerated graphics port (AGP) technology and the emergence of faster 3D chips, means the future is looking good for 3D enthusiasts. For this review, we gathered together as many of the latest-release 3D AGP cards as we could. In total, 19 cards were submitted for review.

A good example of the rapid rate of progress in this field is the growth in available memory. Not so long ago, new PCs were being shipped with 32M of RAM as standard. In this review, 16 out of the 19 cards we tested came with 32M of RAM, just for the card alone. The fact that the cards need this much memory demonstrates just how intensive

3D processing can be. A fairly standard configuration for these high-end cards is 32M of SDRAM, 2x or 4x AGP support, and high processor/memory and RAMDAC speeds.

These are important baseline features when buying a 3D card, but you also need to carefully consider both your intended use and the configuration of your current system. Primarily, 3D graphics

cards are bought by gamers seeking high-performance graphics as they wear out their wrists on a late-model joystick. However, APC found that an older system with a 1x AGP slot received tremendous benefits from a 32M 3D card — as everything ran more smoothly.

The fact that there are so many different chips on the market has also caused problems when deciding which card to buy, as different games and cards support different standards. The most notable of these are OpenGL and Glide. nVidia TNT cards support OpenGL but not Glide, while Voodoo3 supports Glide but not OpenGL. Matrox had a hard time with its Millennium G200 after promising the card would support OpenGL, and then not delivering a functional driver for several months. According to Matrox, this problem will not be repeated. The specifications for the cards on page 114 lists the APIs each graphics card supports.

To get the most out of your graphics card you need the latest drivers. This is true for most computer components and peripherals, but with graphics cards it makes a critical difference. The performance improvements when using a newer driver can be astounding. Even when you install a new graphics card, you can usually rest assured that there is a newer and better driver available on the Web than the one that came with the card.

If you can't find drivers for your specific card on the Web, the manufacturer of its 3D chip should have generic reference drivers available. In some cases these can work better than the drivers supplied with your graphics card.





## Voodoo3 3000

3dfx

Out of the three 3dfx Voodoo3 cards available, we were only able to test the mid-range card, because the Voodoo3 3500 was not yet available in Australia. The card we tested is the only one in this roundup with a Voodoo3 chipset.

How did it stack up against the other 3D chips? Quite well, actually. Considering it has half the SDRAM of nearly every other card we tested, it scored admirably. Its strength is in its ability to render 2D, but is was no slacker in the 3D department. Its results, nestled in the middle of the pack but at the higher end of the Ziff-Davis 3D WinBench 99 scores, indicate it can handle any game you throw at it.

It coped well with full-screen MPEG-1. It went easy on the processor and is capable of high frame rates without dropping any. The Voodoo3 3000 is one of the costlier cards in this review, but it's still good value.

Darren Ellis



<b>Distributor</b>	Innovation
<b>Phone</b>	1300 785 795
<b>Online</b>	<a href="http://www.3dfx.com/">http://www.3dfx.com/</a>
<b>Price</b>	\$499
<b>In short</b>	It may seem pricey, but it performs well and has some bundled games.

## PA3010N

AOpen

Known more as a motherboard manufacturer, AOpen has been making inroads into the graphics card market in recent years. This nVidia Riva TNT2-based graphics card is the first AOpen 3D card we have seen.

The PA3010N is a no-frills card in most respects. It has an average price and produced slightly higher than average 3D performance. It rated well in the Ziff-Davis WinBench 99 MPEG-1 video tests, dropping no frames while maintaining a healthy frame rate. This put it on a par with most of the other cards, resting in the middle of the pack.

It was better at processing 2D than 3D, scoring highly in both the Ziff-Davis Business Graphics WinBench 99 and High-End Graphics WinBench 99. Compared with the other TNT2-based cards, the PA3010N did well, but was not the best. The bundled CD contains no games, but it does include a variety of utilities.

Darren Ellis

<b>Distributor</b>	Servex
<b>Phone</b>	(02) 8762 350
<b>Online</b>	<a href="http://www.servex.com.au/">http://www.servex.com.au/</a>
<b>Price</b>	\$349
<b>In short</b>	A cheaper and better performer than some reviewed here.

## AGP-V3800 TVR

Asus

The Asus AGP-V3800 TVR is no exception to the rule that you get what you pay for. This card will make a hefty dent in your hip pocket (some others, including its sibling the Asus AGP-V3800 Ultra Deluxe, will make an even bigger dent).

The Asus cards are impressive when it comes to graphics processing. In both 2D tests, they held the second and third rankings by a fair margin. In the Ziff-Davis 3D WinBench 99 test, the AGP-V3800 TVR scored well above average, coming second behind the Gigabyte GA-660 out of the nVidia Riva TNT2-based cards and eighth overall. In both full-screen video tests it did not tax the CPU badly, managed a good frame rate and didn't drop any frames.

It has an extra chip and port built in for VR headset support — all you need is the glasses and software.

Darren Ellis



<b>Distributor</b>	Cassa
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<b>Online</b>	<a href="http://www.asus.com.tw/">http://www.asus.com.tw/</a>
<b>Price</b>	\$489
<b>In short</b>	At the higher end of the price scale, but it's a great little performer.

## AGP-V3800 Ultra Deluxe

Asus

This is definitely one of the best 3D cards we tested. It scored 36.5 points more in the Ziff-Davis 3D WinBench 99 test than the closest card (also an nVidia Riva TNT2 Ultra-based card), and until we put the Matrox G400 under the hammer, it was the first to crack the 900 point mark. It was no slouch in the 2D department either, coming second in the Business Graphics WinBench 99 and the High-End Graphics WinBench 99 tests.

The Deluxe version of this card comes with VR glasses that work better than any others we've played with. One of the best features of the glasses is the ability to call up an in-game onscreen display. You can configure the 3D image, including depth perception and eye distance.

The best thing is there's no need to wait for a good game to test them, as the card comes with two bundled titles. Unfortunately, this level of performance and features has a price. In the case of the AGP-V3800 Ultra Deluxe, it's \$649.

Darren Ellis

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<b>Online</b>	<a href="http://www.asus.com/">http://www.asus.com/</a>
<b>Price</b>	\$649
<b>In short</b>	Costly, but worth the extra dollars if you can afford it.

## Rage Fury

ATI

If you don't care too much about 2D but love your 3D and full-screen video, then Rage Fury is the graphics card for you. In both the Ziff-Davis WinBench 99 graphics tests, it rated right near the bottom of the heap with well below average scores. It raised itself higher when processing 3D, coming sixth in the 3D WinBench 99 with a surprisingly good score.

In the WinBench 99 Indeo and MPEG-1 full-screen video tests, the card didn't drop any frames. Most baffling was the out-of-this-world frame rate it achieved with the MPEG-1 test (a humungous 141fps), and it did this while placing little strain on the CPU. There's some real MPEG decompression hardware here.

The ATI Rage Fury has an average price, and although the 2D aspects are disappointing, the 3D and full-screen video



capabilities, plus the bundled games, should please most people.

**Darren Ellis**

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<b>In short</b>	Moderate price, great for gamers or movie watchers.

## Xpert 128

**ATI**

The ATI Xpert 128 is the second ATI card to feature the ATI Rage 128 GL chipset, but it has half the SDRAM of the other card, the Rage Fury. It beat the Rage Fury in a few tests, notably the 2D tests. Only four cards featured less than 32M of SDRAM and of these four, the Xpert 128 was not one of the best.

The ATI Rage 128 GL chipset has been optimised for MPEG-1 and MPEG-2 and this is obvious in the test results. It dropped no frames, was easy on the CPU and racked up a whopping 136fps. This performance was much better than cards with higher specifications.

In both 2D tests, the Xpert 128 came just below average — still better than its sibling the Rage Fury — but below the other 16M cards. Unfortunately it performed worst in the 3D WinBench 99 tests, scoring poorly in comparison with the current top of the range cards. Connection options are pretty thin on the ground with this card; it is limited to VGA.

**Darren Ellis**

<b>Distributor</b>	BBF Components
<b>Phone</b>	1800 803 802
<b>Online</b>	<a href="http://www.atitech.com/">http://www.atitech.com/</a>
<b>Price</b>	\$329
<b>In short</b>	Good for everything but 3D.

## 3D Blaster Riva TNT2 Ultra

**Creative Labs**

Built and priced to compete against Diamond Multimedia's Viper V770 Ultra, Creative Labs' current top-of-the-line product is for those who take their 3D very seriously. The Creative Labs and Diamond cards are not quite as expensive as the Asus AGP-V3800 Ultra Deluxe, but the Asus throws in 3D glasses and video capture to justify the extra cost. Aside from its smoking 3D performance, the Creative Labs card isn't all that impressive. Its Ziff-Davis

3D WinBench 99 score was excellent, slightly behind the Diamond Viper V770 Ultra. However, it scored close to average in the Business and High-End Graphics WinMark 99, and its video playback wasn't terrific. Considering the price, you might want a little more on the 2D graphics side, but if 3D is your main concern, you can't go far wrong. And while the Diamond card performed a little better in the 2D graphics department, the Creative Labs card has the advantage of S-Video and composite video outputs.

**Josh Mehlman**

<b>Distributor</b>	Creative Pacific
<b>Phone</b>	(03) 9906 8887
<b>Online</b>	<a href="http://www.cppl.com.au/">http://www.cppl.com.au/</a>
<b>Price</b>	\$549
<b>In short</b>	Great 3D, the rest is a little dubious.

## 3D Blaster Savage4

**Creative Labs**

There are three graphics cards in this roundup that are based on S3's Savage4 chipset and the competition between the them was fairly tough at times. What became apparent is that Savage4 is not one of the most capable chipsets when it comes to rendering 2D, nor the strongest at 3D.

The three Savage4-based cards were the bottom three performers in the Ziff-Davis Business Graphics WinBench 99 and jostled with the ATI Rage Fury for the bottom four slots in the High-End Graphics WinBench 99. For 3D, the 3D Blaster Savage4 led the S3 charge, with a score that was not the greatest, but still above par. The card dropped a large amount of frames in both full-screen video tests, but in full swing it rated 105fps, which is still quite high.

It is very competitively priced and the S3 texture compression (S3TC) within games has to be seen to be believed.

**Darren Ellis**

<b>Distributor</b>	Creative Pacific
<b>Phone</b>	(02) 9906 8887
<b>Online</b>	<a href="http://www.cppl.com.au/">http://www.cppl.com.au/</a>
<b>Price</b>	\$299
<b>In short</b>	Not the best, but not the worst.

## Stealth III S540

**Diamond**

All the cards we received that used the S3 Savage4 chip were fairly ordinary performers compared to the cards using other chips. Diamond and Creative Labs usually have similar products and prices; in this case the Diamond Stealth III S540 is the same configuration and price as the Creative Labs 3D Blaster Savage4. The only difference is that the Stealth comes with a five-year warranty, while the Blaster only comes with a one-year warranty.

The Stealth and Blaster cards jostled for positions in most of the benchmarks. The Stealth III S540 scored poorly in the Ziff-Davis 2D Graphics WinMark 99 tests, and its score in 3D WinBench 99 was also below average. Its video playback was generally good, achieving high frame rates, although this placed a very high load on the processor.

Although there was little to separate the Diamond Stealth from its Creative Labs competitor, neither were as impressive as the MSI MS-8806 TNT2, which was also \$50 cheaper.

**Josh Mehlman**

<b>Distributor</b>	Chips and Bits
<b>Phone</b>	(03) 9696 1911
<b>Online</b>	<a href="http://www.diamondmm.com/">http://www.diamondmm.com/</a>
<b>Price</b>	\$299
<b>In short</b>	A safe bet, but not exciting.

## Viper V770

**Diamond**

Of the two V770 cards tested this is the lower-clocked Viper card, and it came slightly below the V770 Ultra in most tests. In the Ziff-Davis Business Graphics WinBench 99 test it was right on average, but below average in the High-End Graphics test, compared to the V770 Ultra's well above average score in both.

The Viper V770 scored above average in the 3D WinBench 99 test and its results were in the middle among the TNT2-based cards. Surprisingly, it performed better in the video tests than the Ultra. It also dropped frames in both the Indeo and MPEG-1 tests, but it didn't drop as many as the Ultra. It was just as heavy on the processor as the Ultra model, but managed a slightly better frame rate.

The Viper V770 is a good card that produced decent results in the Ziff-Davis test-







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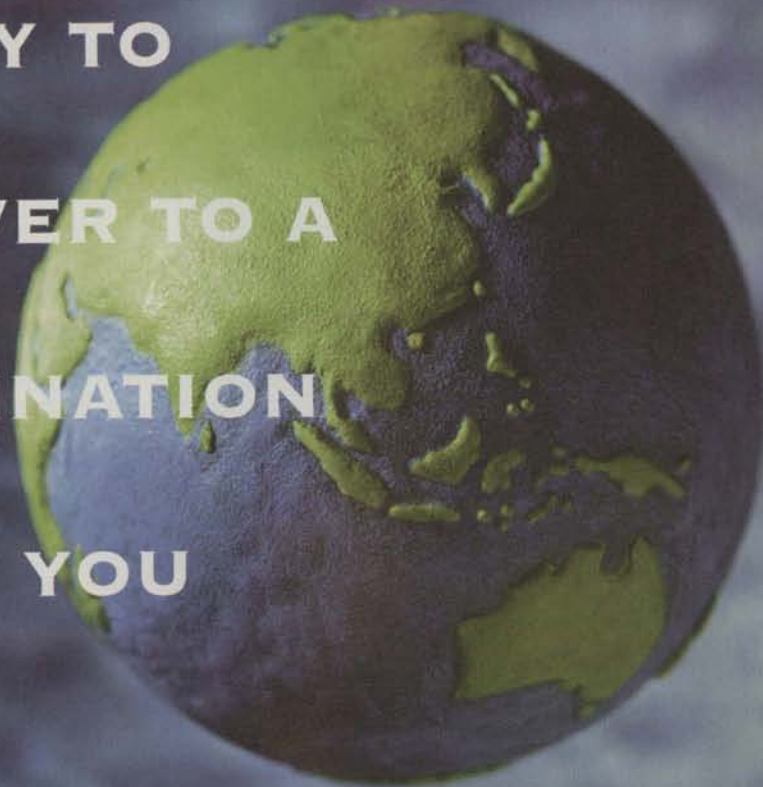


## Results: Graphics cards

Product	3dfx Voodoo3 3000	AOpen PA3010N	Asus AGP-V3800 TVR	Asus AGP-V3800 Ultra Deluxe	ATI Rage Fury	ATI Xpert 128	Creative 3D Blaster Riva TNT2 Ultra	Creative 3D Blaster Savage4	Diamond Stealth III S540	Diamond Viper V770
<b>3D WinBench 99 quality tests*</b>										
Quality/ 1/Flat shading	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 2/Gouraud shading	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 3/Dithering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 4/Z-buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 5/Perspective correct textures	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 6/Nearest	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 7/Linear	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 8/Nearest mipmap nearest	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 9/Nearest mipmap linear	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/10/Linear mipmap nearest	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/11/Linear mipmap linear	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/12/Mipmap LOD bias	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/13/Modulate texture blending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/14/Decal texture blending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/15/DecalAlpha texture blending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/16/ModulateAlpha texture blending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/17/Flat wrap texture addressing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/18/Cylindrical wrap u	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/19/Cylindrical wrap v	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/20/Clamp texture addressing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/21/Mirror texture addressing	✓	✓	✓	✓	✗	✗	✓	✓	✓	✓
Quality/22/Cull counterclockwise	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/23/Cull clockwise	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/24/Cull none	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/25/Fog vertex linear	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/26/Fog table linear	✓	∅	∅	∅	✗	✗	∅	✓	✓	∅
Quality/27/Fog table exponential	∅	∅	∅	∅	✗	✗	∅	✓	✓	∅
Quality/28/Specular highlights	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/29/Colour key transparency	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/30/Alpha transparency	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/31/Source alpha pixel blending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/32/Add pixel blending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/33/Modulate pixel blending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/34/Modulate 2x pixel blending	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/35/Alpha vertices	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/36/Perspective correct alpha	∅	✓	✓	✓	∅	∅	✓	✓	✓	✓
Quality/37/Alpha comparison greater than	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/38/Alpha comparison greater than or equal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/39/Alpha comparison less than	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/40/Alpha comparison less than or equal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/41/Z comparison greater than	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/42/Z comparison greater or equal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/43/Z comparison less than	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/44/Z comparison less than or equal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/45/Z accuracy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/46/Z bias	∅	✗	✗	✗	✗	✗	✗	✗	✗	✗
Quality/47/Anti-aliasing 640 by 480	✗	✗	∅	∅	✓	✓	✗	✗	✗	✗
Quality/48/Triangle rasterisation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/49/Texture fidelity	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/50/Texture swapping	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/51/High triangle count	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/52/Fog vertex and colour key	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/53/Fog vertex and alpha	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/54/Alpha and linear	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/55/Alpha and linear mipmap linear	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/56/Small triangles	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/57/Perspective correct colour	∅	✓	✓	✓	∅	∅	✓	✓	✓	✓
Quality/58/Perspective correct specular	∅	✓	✓	✓	∅	∅	✓	✓	✓	✓
Quality/59/Anti-aliasing 1,024 by 768	✗	✗	∅	∅	∅	∅	✗	✗	✗	✗



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## Results: Graphics cards

### Product

#### 3D WinBench 99 quality tests\*

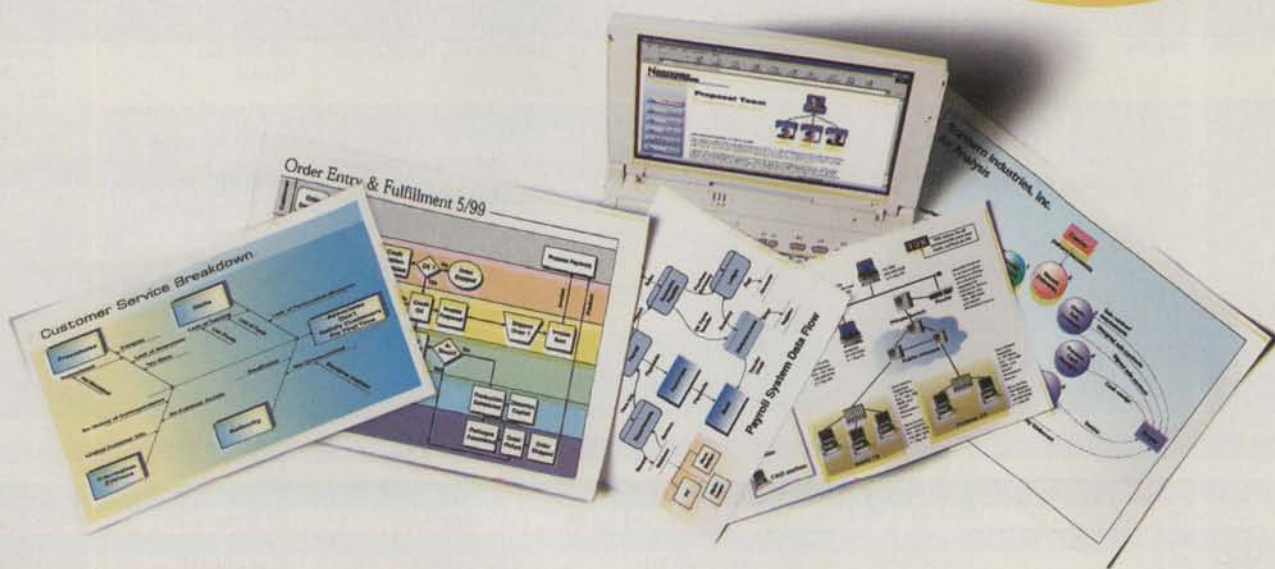
	Diamond Viper V770 Ultra	Gigabyte GA-660	Guillemot Maxi Gamer Phoenix 2	Guillemot Maxi Gamer Xentor	Joytech Apollo Savage4 Pro Plus	Joytech Apollo TNT2 Vanta	Leadtek WinFast 3D S320 II Ultra	MSI MS-8806	Matrox Millennium G400 MAX
Quality/ 1/Flat shading	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 2/Gouraud shading	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 3/Dithering	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 4/Z-buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 5/Perspective correct textures	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 6/Nearest	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 7/Linear	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 8/Nearest mipmap nearest	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/ 9/Nearest mipmap linear	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/10/Linear mipmap nearest	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/11/Linear mipmap linear	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/12/Mipmap LOD bias	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/13/Modulate texture blending	✓	✓	✓	✓	✓	✓	✓	✓	✗
Quality/14/Decal texture blending	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/15/DecalAlpha texture blending	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/16/ModulateAlpha texture blending	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/17/Flat wrap texture addressing	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/18/Cylindrical wrap u	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/19/Cylindrical wrap v	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/20/Clamp texture addressing	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/21/Mirror texture addressing	✓	✓	✓	✓	✓	✓	✓	✓	✗
Quality/22/Cull counterclockwise	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/23/Cull clockwise	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/24/Cull none	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/25/Fog vertex linear	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/26/Fog table linear	Ø	Ø	Ø	Ø	✓	Ø	Ø	Ø	✓
Quality/27/Fog table exponential	Ø	Ø	Ø	Ø	✓	Ø	Ø	Ø	✓
Quality/28/Specular highlights	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/29/Colour key transparency	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/30/Alpha transparency	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/31/Source alpha pixel blending	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/32/Add pixel blending	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/33/Modulate pixel blending	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/34/Modulate 2x pixel blending	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/35/Alpha vertices	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/36/Perspective correct alpha	✓	✓	✓	✓	✓	✓	✓	✓	Ø
Quality/37/Alpha comparison greater than	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/38/Alpha comparison greater than or equal	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/39/Alpha comparison less than	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/40/Alpha comparison less than or equal	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/41/Z comparison greater than	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/42/Z comparison greater or equal	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/43/Z comparison less than	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/44/Z comparison less than or equal	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/45/Z accuracy	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/46/Z bias	✗	✗	✗	✗	✗	✗	✗	✗	✗
Quality/47/Anti-aliasing 640 by 480	✗	✗	✗	✗	✗	✗	✗	✗	✓
Quality/48/Triangle rasterisation	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/49/Texture fidelity	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/50/Texture swapping	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/51/High triangle count	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/52/Fog vertex and colour key	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/53/Fog vertex and alpha	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/54/Alpha and linear	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/55/Alpha and linear mipmap linear	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/56/Small triangles	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quality/57/Perspective correct colour	✓	✓	✓	✓	✓	✓	✓	✓	Ø
Quality/58/Perspective correct specular	✓	✓	✓	✓	✓	✓	✓	✓	Ø
Quality/59/Anti-aliasing 1,024 by 768	✗	✗	✗	✗	✗	✗	✗	✗	✓

\* See disclaimer page 122



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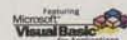
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## Specifications: Graphics cards I

Product	3dfx Voodoo3 3000	AOOpen PA3010N	Asus AGP-V3800 Ultra Deluxe	Asus AGP-V3800 TVR	ATI Rage Fury
Distributor	Innovision	Servex	Cassa	Cassa	Servex
Phone	1300 785 795	(02) 8762 3500	(07) 5445 2992	(07) 5445 2992	(02) 8762 3500
Price	\$499	\$349	\$489	\$649	\$369
Warranty	1 year	2 years RTB	1 year	1 year	5 years limited
Graphics processor	Voodoo3	nVidia Riva TNT2	nVidia Riva TNT2	nVidia Riva TNT2 Ultra	ATI Rage 128GL
Video memory	16M SDRAM	32M SDRAM	32M SDRAM	32M SDRAM	32M SDRAM
Maximum video memory	16M	32M	32M	32M	32M
Processor/memory clock speed	166MHz	166MHz	125MHz/150MHz	150MHz/183MHz	143MHz
Maximum resolution (dpi)/colour depth/refresh	2,048 x 1,536/32bit/75Hz	1,920 x 1,200/32bit/60Hz	1,900 x 1,200/32bit/75Hz	1,900 x 1,200/32bit/75Hz	1,920 x 1,200/32bit/80Hz
Maximum 3D resolution (dpi)/colour depth/refresh	2,048 x 1,536/32bit/75Hz	1,024 x 786/32bit/150Hz	1,900 x 1,200/32bit/75Hz	1,900 x 1,200/32bit/75Hz	1,920 x 1,200/32bit/80Hz
RAMDAC speed	350MHz	300MHz	300MHz	300MHz	250MHz
AGP Type	2x	4x	4x	4x	2x
PCI version available	No	No	No	No	No
<b>Output types</b>					
VGA 15-pin	Yes	Yes	Yes	Yes	Yes
S-Video (PAL/NTSC)	Yes	Yes	Yes	Yes	Yes
VR (for glasses)	No	No	Yes	Yes	No
RCA (composite PAL/NTSC)	No	Yes	Yes	Yes	No
BNC	No	No	No	No	No
DDC (digital)	No	Yes	No	No	No
Dual monitor support (hardware)	No	Yes	No	No	Yes
Platforms supported	Windows 95/98/NT	Windows 95/98/NT/2000 ready	Windows 95/98/NT/2000 ready	Windows 95/98/NT/2000 ready	Windows 95/98/NT
APIs supported	DirectX, Glide, OpenGL	Direct3D, DirectX, OpenGL	Direct3D, DirectX, OpenGL	Direct3D, DirectX, OpenGL	DirectX, Glide, OpenGL
Bundled software	Descent: Freespace, Need for Speed III, Unreal	Assorted utilities	Extreme-G2, Turok 2	Extreme-G2, Turok 2	Expendable, Half-life, Motor Racer 2
Other			Has video-in and can capture video. All cables supplied.	Asus VR 3D glasses included. Also has video-in and can capture video. All cables supplied.	
Product	ATI Xpert 128	Creative Labs 3D Blaster Riva TNT2 Ultra	Creative Labs 3D Blaster Savage4	Diamond Stealth III S540	Diamond Viper V770
Distributor	BBF Components	Creative Pacific	Creative Pacific	Chips and Bits	Chips and Bits
Phone	1800 803 802	(02) 9906 8887	(02) 9906 8887	(03) 9696 1911	(03) 9696 1911
Price	\$329	\$549	\$299	\$299	\$399
Warranty	5 years limited	1 year	1 year	5 years	5 years
Graphics processor	ATI Rage 128GL	nVidia Riva TNT2 Ultra	S3 Savage4	S3 Savage4 Pro+	nVidia Riva TNT2
Video memory	16M SDRAM	32M SDRAM	32M SDRAM	32M SDRAM	32M SDRAM
Maximum video memory	16M	32M	32M	32M	32M
Processor/memory clock speed	125MHz	150MHz/183MHz	125MHz/143MHz	125MHz/143MHz	125MHz/150MHz
Maximum resolution (dpi)/colour depth/refresh	1,920 x 1,200/32bit/76Hz	2,048 x 1,538/32bit/60Hz	1,920 x 1,200/32bit/200Hz	1,920 x 1,440/32bit/200Hz	2,048 x 1,536/32bit/200Hz
Maximum 3D resolution (dpi)/colour depth/refresh	1,280 x 1,024/32bit/76Hz	2,048 x 1,538/32bit/60Hz	1,920 x 1,200/32bit/200Hz	1,920 x 1,440/32bit/200Hz	2,048 x 1,536/32bit/200Hz
RAMDAC speed		300MHz	300MHz	300MHz	300MHz
AGP Type	2x	4x	4x	4x	4x
PCI version available	No	Coming soon	Yes	No	No
<b>Output types</b>					
VGA 15-pin	Yes	Yes	Yes	Yes	Yes
S-Video (PAL/NTSC)	No	Yes	No	No	No
VR (for glasses)	No	No	No	No	No
RCA (composite PAL/NTSC)	No	Yes	No	No	No
BNC	No	No	No	No	No
DDC (digital)	No	No	No	No	No
Dual monitor support (hardware)	No	Yes	Yes	No	No
Platforms supported	Windows 95/98/NT	Windows 95/98/NT	Windows 95/98/NT	Windows 95/98/NT/2000 ready	Windows 95/98/NT
APIs supported	Direct3D, DirectX, OpenGL	Direct3D, OpenGL	Direct3D, OpenGL, S3TC	Direct3D, OpenGL	DirectX, OpenGL
Bundled software	3D Sensations, Expendable, Moto Racer 2	Colorific, 3 Deep	Colorific, 3 Deep Update Wizard	Diamond InControl Tools 99, Diamond Zoran SoftDVD, Diamond InControl Tools 99, online game offers	
<b>Note:</b> APC takes no responsibility for incorrect information supplied by vendors.					



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G400 Web Site at:

[www.matrox.com/mga/g400/main.htm](http://www.matrox.com/mga/g400/main.htm)

# matrox



## Specifications: Graphics cards II

Product	Diamond Viper V770 Ultra	Gigabyte GA-660	Guillemot Maxi Gamer Phoenix 2	Guillemot Maxi Gamer Xentor	Joytech Apollo Savage4 Pro Plus
Distributor	Chips and Bits	Global Business Technology	Acclaim	Acclaim	Global Business Technology
Phone	(03) 9696 1911	(02) 9644 3900	(03) 9380 9681	(03) 9380 9681	(02) 9644 3900
Price	\$549	\$299	\$209	\$339	\$180
Warranty	5 years	N/A	3 years	3 years	1 year
Graphics processor	nVidia Riva TNT2 Ultra	nVidia Riva TNT2	nVidia Riva TNT2 Vanta	nVidia Riva TNT2	S3 Savage4 Pro Plus
Video memory	32M SDRAM	32M SDRAM	8M SDRAM	16M SDRAM	32M SDRAM
Maximum video memory	32M	32M	8M	16M	32M
Processor/memory clock speed	1920 x 1440/32bit/200Hz	125MHz/150MHz	100MHz/143MHz	135MHz/166MHz	143MHz
Maximum resolution (dpi)/colour depth/refresh	2,048 x 1,536/32bit/200Hz	2,048 x 1,536/16bit/60Hz	1,920 x 1,080/16bit/75Hz	1,920 x 1,440/16bit/75Hz	1,920 x 1,400/16bit
Maximum 3D resolution (dpi)/colour depth/refresh	2,048 x 1,536/32bit/200Hz	1,920 x 1,080/16bit/75Hz	1,920 x 1,440/16bit/75Hz	1,920 x 1,400/16bit	
RAMDAC speed	300MHz	300MHz	250MHz	300MHz	300MHz
AGP Type	4x	4x	2x	2x	4x
PCI version available	No	No	No	No	No
<b>Output types</b>					
VGA 15-pin	Yes	Yes	Yes	Yes	Yes
S-Video (PAL/NTSC)	No	Optional	No	No	Yes
VR (for glasses)	No	No	No	No	No
RCA (composite PAL/NTSC)	No	Optional	No	No	No
BNC	No	No	No	No	No
DDC (digital)	No	Optional	No	No	Yes
Dual monitor support (hardware)	No	No	No	No	Yes
Platforms supported	Windows 95/98/NT	Windows 95/98/NT	Windows 95/98/NT/2000 ready	Windows 95/98/NT/2000 ready	
APIs supported	DirectX, OpenGL	ActiveX, Direct3D, DirectDraw, DirectVideo, OpenGL	Direct3D, DirectX, OpenGL	Direct3D, DirectX, OpenGL	OpenGL
Bundled software	Zoran SoftDVD, Diamond InControl Tools 99, online game offers	DirectX, CDWizard '98, PC-Cillin, HighPoint Xstore Pro	XingDVD Player Game demos	Games	
Other				Optimised for fullscreen MPEG-1, MPEG-2 and Microsoft DirectShow	Optimised for full-screen DVD, MPEG-1, MPEG-2 Microsoft DirectShow playback

Product	Joytech Apollo TNT2 Vanta	Leadtek WinFast 3D 5320 II Ultra	Matrox Millennium G400 MAX	MSI MS-8806
Distributor	Global Business Technology	BCN Technology	Focal Point Computing	MSI
Phone	(02) 9644 3900	(02) 9417 3688	(03) 9525 1144	(02) 9748 0070
Price	\$145	\$399	\$495	\$250
Warranty	1 year	1 year	3 years	2 years
Graphics processor	nVidia Riva TNT2 Vanta	nVidia Riva TNT2 Ultra	Matrox G400	nVidia Riva TNT2
Video memory	32M SDRAM	32M SDRAM	32M SGRAM	32M SDRAM
Maximum video memory	32M	32M	32M	32M
Processor/memory clock speed	125MHz	150MHz/183MHz	Undisclosed	150MHz
Maximum resolution/colour depth/refresh	2,048 x 1,536/32bit	2,048 x 1,536/16bit/75Hz	2,048 x 1,536/32bit/85Hz	1,920 x 1,200/32bit/75Hz
Maximum 3D resolution/colour depth/refresh	2,048 x 1,536/32bit	1,600 x 1,200/32bit/85Hz	2,048 x 1,536/32bit/85Hz	
RAMDAC speed	250MHz	300MHz	360MHz	300MHz
AGP Type	4x	4x	4x	4x
PCI version available	No	No	No	Yes, PCI 2.1
<b>Output types</b>				
VGA 15-pin	Yes	Yes	Yes, 2 on card	Yes
S-Video (PAL/NTSC)	Yes	Yes	Yes (adaptor dongle)	Optional
VR (for glasses)	No	No	No	No
RCA (composite PAL/NTSC)	No	No	Yes (adaptor dongle)	No
BNC	No	No	No	No
DDC (digital)	Yes	No	Optional upgrade	DDC2B
Dual monitor support (hardware)	Yes	No	Yes	Yes
Platforms supported	Windows 95/98/NT/Linux	Windows 95/98/NT	Windows 95/98/NT, OS/2	Windows 95/98/NT
APIs supported	OpenGL	Direct3D, OpenGL	Direct3D, OpenGL	
Bundled software	Games	PowerDVD, Web3D, VRCreator, Wirl, 3D/FX, Digital Video Producer	MicroGrafx Picture Publisher 8, Simply 3D 3, Expendable, PointCast	CD drivers RealMation, VDOLive, Network, Matrox Software DVD Player
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ing, but it was not close to the best in this review. The bonus of having a Diamond card is that the company provides regular driver updates and support on the Web.

**Darren Ellis**

<b>Distributor</b>	Chips and Bits
<b>Phone</b>	(03) 9696 1911
<b>Online</b>	<a href="http://www.diamondmm.com/">http://www.diamondmm.com/</a>
<b>Price</b>	\$399
<b>In short</b>	A good brand, but expensive.

## Viper V770 Ultra

**Diamond**

This is definitely a card to watch. It is the only one that came close to catching the Asus AGP-V3800 Ultra Deluxe and Matrox Millennium G400 cards in the Ziff-Davis 3D WinBench 99 benchmark. Its score was remarkably high and it was great to watch its performance. In 2D it also proved capable. The V770 Ultra did better in the Business Graphics WinBench 99 test (fourth) than it did in the High-End Graphics WinBench 99 (in the middle of the pack).

Its scores in both the video tests indicate a difficulty in handling full-screen video. It dropped a lot of frames in the WinBench 99 Indeo video and WinBench 99 MPEG-1 tests, placed a bit of a strain on the CPU (but not the worst in this review), and came last in the frame rate count. Don't expect to be watching too much video with the V770 Ultra.

**Darren Ellis**

<b>Distributor</b>	Chips & Bits
<b>Phone</b>	(03) 9696 1911
<b>Online</b>	<a href="http://www.diamondmm.com/">http://www.diamondmm.com/</a>
<b>Price</b>	\$549
<b>In short</b>	Excellent 3D performance, but heavy on the hip pocket.

## GA-660

**Gigabyte**

Gigabyte has been making a name for itself in the motherboard market and it looks like it will be doing the same in the 3D graphics market. APC hasn't looked at any of Gigabyte's graphics cards before, but if the GA-660 is any indication, there are good things on the way.

The GA-660 was the fastest nVidia Riva TNT2-based card behind the higher-clocked TNT2 Ultra-based cards. It posted good results in the Ziff-Davis 2D tests, com-

ing a comfortable fifth place in both. It also managed to come fifth in the 3D WinBench 99 test. It was light on the processor during the full-screen video tests, and achieved a reasonable frame rate without dropping any frames.

The GA-660 is also one of the cheaper cards in this roundup, weighing in at \$399. This is \$49 more than its closest competitor, the MSI card, but the GA-660 managed to outperform it.

**Darren Ellis**

<b>Distributor</b>	Global Business Technology
<b>Phone</b>	(02) 9644 3900
<b>Online</b>	<a href="http://www.gbt.com.au/">http://www.gbt.com.au/</a>
<b>Price</b>	\$299
<b>In short</b>	Decent price, decent performance.

## Maxi Gamer Phoenix 2

**Guillemot**

APC received two graphics cards from Guillemot and both have lower specifications than the other cards in this review. We were unable to test Guillemot's latest cards, as samples weren't available in time for this review. Even though the Maxi Gamer Phoenix 2 is built on a Riva TNT2 Vanta chipset and has a mere 8M of SDRAM (one quarter of what most cards offer these days), it still managed to outperform quite a few cards.

It generally rated as well as a 3D card with minimal SDRAM should, but it held a few surprises. It was below average in the Ziff-Davis Business Graphics WinBench 99 but was competitive with stronger cards in the High-End Graphics WinBench 99 test. Its score put it equal fifth with the AOpen PA3010N (a TNT2-based card with four times the amount of SDRAM).

The Phoenix 2's video results were not the best, especially for a card that claims to be optimised for MPEG-1, MPEG-2 and DVD playback.

**Darren Ellis**

<b>Distributor</b>	Acclaim
<b>Phone</b>	(03) 9380 9681
<b>Online</b>	<a href="http://www.guillemot.com/">http://www.guillemot.com/</a>
<b>Price</b>	\$209
<b>In short</b>	Good value considering its specifications.

## Maxi Gamer Xentor

**Guillemot**

Another Guillemot card, the Maxi Gamer Xentor has a bit more power onboard than

the Phoenix 2 — in this case a TNT2 chipset and 16M of SDRAM. Even though it had a handicap of half the SDRAM of most of the other cards (except for the ATI Xpert 128 and 3dfx Voodoo3 3000), it still received decent scores in the Ziff-Davis benchmarks.

Its performance was average in both 2D benchmarks but well below average in the 3D WinBench 99 test, although it did beat four more highly configured cards.



Like the Phoenix 2, the Xentor didn't cope well with full-screen video, it dropped many frames and strained the CPU. The Xentor is a little expensive for the quality of graphics it produced.

**Darren Ellis**

<b>Distributor</b>	Acclaim
<b>Phone</b>	(03) 9380 9681
<b>Online</b>	<a href="http://www.guillemot.com/">http://www.guillemot.com/</a>
<b>Price</b>	\$339
<b>In short</b>	Low specifications; a bit more oomph is expected for the price.

## Apollo Savage4 Pro Plus

**Joytech**

When APC's reviewers look at a product, even when it isn't the best, we can usually find a few nice things to say about it. In the case of the Joytech Apollo Savage4 Pro Plus, aside from the fact that it's inexpensive, we failed.

Admittedly, when you're looking at the cheapest card in a review, it's understandable if it bottoms out in almost every test. But this isn't the cheapest card; that honour goes to Joytech's other entry in this review, the Apollo TNT2 Vanta, which is a strong performer and well worth the price. The Apollo Savage4 Pro Plus had too strong a showing on the bottom row of the test results to be worth the price.

**Josh Mehlman**

<b>Distributor</b>	Global Business Technology
<b>Phone</b>	(02) 9644 3900
<b>Online</b>	<a href="http://www.gbt.com.au/">http://www.gbt.com.au/</a>
<b>Price</b>	\$180
<b>In short</b>	It ain't worth it.



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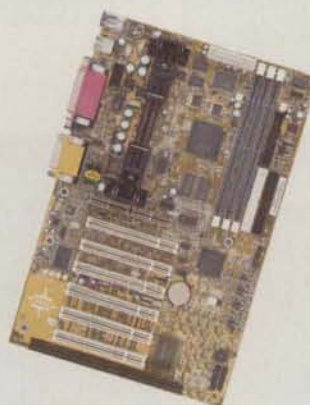
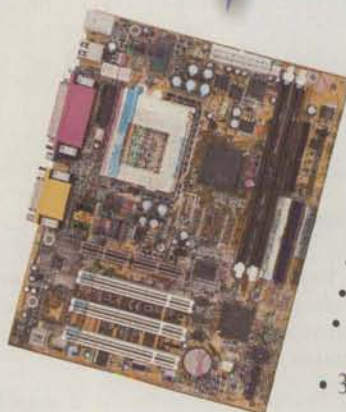
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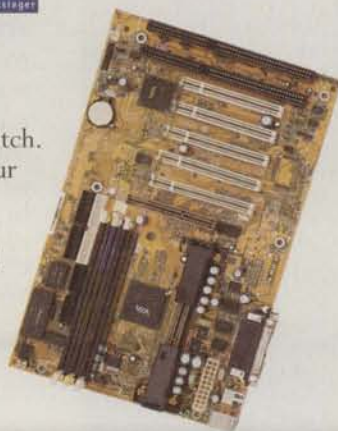
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- 5PCI/2ISA/1AGP, ATX
- Y2K/PC99 Compliant



## MS-6182- Intel 810

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- Free of Jumper and DIP Switch.
- High Performance 3D Graphics/Audio Integrated.
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- Free PC Health Mon. and Anti-Virus Software.
- 6PCI/1ISA/3DIMM/1AMR/1PTI, ATX

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## Business Graphics WinBench 99

Matrox Millennium	
G400 MAX	184
Asus AGP-V3800	
Ultra Deluxe	180
Asus AGP-V3800 TVR	179.3
Diamond Viper	
V770 Ultra	174
Gigabyte GA-660	173
AOpen PA3010N	171
Guillemot Maxi	
Gamer Xentor	170
3dfx Voodoo3 3000	170
MSI MS-8806	169.3
Leadtek WinFast	
3D S320 II Ultra	169
Joytech Apollo	
TNT2 Vanta	169
Diamond Viper V770	168
Creative Labs 3D	
Blaster Riva TNT2	
Ultra	168
Guillemot Maxi	
Gamer Phoenix 2	167
ATI Xpert 128	167
ATI Rage Fury	164
Diamond Stealth III	
S540	155
Creative Labs	
3D Blaster Savage4	152
Joytech Apollo	
Savage4 Pro Plus	151

## High-End Graphics WinBench 99

Asus AGP-V3800 TVR	500.3
Asus AGP-V3800 Ultra	
Deluxe	500
Matrox Millennium	
G400 MAX	496
3dfx Voodoo3 3000	474
Gigabyte GA-660	474
AOpen PA3010N	469
Guillemot Maxi Gamer	
Phoenix 2	469
MSI MS-8806	468.6
Guillemot Maxi	
Gamer Xentor	468.5
Leadtek WinFast	
3D S320 II Ultra	468
Joytech Apollo	
TNT2 Vanta	467
Diamond Viper	
V770 Ultra	466
ATI Xpert 128	461
Creative Labs 3D	
Blaster Riva TNT2 Ultra	460
Diamond Viper V770	458
Creative Labs 3D	
Blaster Savage4	454
Diamond Stealth	
III S540	453
ATI Rage Fury	450
Joytech Apollo	
Savage4 Pro Plus	448.5

## 3D WinBench 99

Matrox Millennium	
G400 MAX	933
Asus AGP-V3800	
Ultra Deluxe	906.5
Diamond Viper	
V770 Ultra	870
Creative Labs 3D	
Blaster Riva	
TNT2 Ultra	864.5
Gigabyte GA-660	856
ATI Rage Fury	855
Leadtek WinFast 3D	
S320 II Ultra	852
Asus AGP-V3800 TVR	838.6
3dfx Voodoo3 3000	831
Diamond Viper V770	815
MSI MS-8806	810.5
AOpen PA3010N	803
Creative Labs 3D	
Blaster Savage4	769.5
Guillemot Maxi	
Gamer Xentor	715
Diamond Stealth	
III S540	687
Joytech Apollo	
TNT2 Vanta	645
Guillemot Maxi	
Gamer Phoenix 2	632
Joytech Apollo	
Savage4 Pro Plus	613
ATI Xpert 128	577

WinBench 99 Indeo video 4.1,  
640 by 480, 30fps, 900K/sec:  
Frames dropped

Matrox Millennium	
G400 MAX	0
ATI Xpert 128	0
3dfx Voodoo3 3000	0
AOpen PA3010N	0
Asus AGP-V3800 TVR	0
Asus AGP-V3800 Ultra	
Deluxe	0
ATI Rage Fury	0
Diamond Stealth III S540	0
Gigabyte GA-660	0
Joytech Apollo TNT2	
Vanta	0
Leadtek WinFast 3D	
S320 II Ultra	0
MSI MS-8806	0
Diamond Viper V770	19
Guillemot Maxi Gamer	
Phoenix 2	27
Guillemot Maxi Gamer	
Xentor	29
Creative Labs 3D Blaster	
Riva TNT2 Ultra	39
Diamond Viper V770	
Ultra	41
Creative Labs 3D	
Blaster Savage4	78
Joytech Apollo	
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WinBench 99, MPEG-1 video, 352 by 240, 30fps, 300K/sec: CPU utilisation (%)

Matrox Millennium	
G400 MAX	24.7
ATI Rage Fury	25
MSI MS-8806	25.1
3dfx Voodoo3 3000	25.2
ATI Xpert 128	25.3
Asus AGP-V3800	
Ultra Deluxe	25.4
Leadtek WinFast 3D	
S320 II Ultra	25.5
Gigabyte GA-660	25.6
Joytech Apollo TNT2	
Vanta	25.6
AOpen PA3010N	25.7
Asus AGP-V3800 TVR	25.9
Diamond Stealth III S540	27.1
Diamond Viper V770	29.4
Diamond Viper V770 Ultra	29.4
Creative Labs 3D	
Blaster Riva TNT2 Ultra	30.5
Guillemot Maxi	
Gamer Xentor	30.6
Joytech Apollo Savage4 Pro Plus	31.1
Creative Labs 3D	
Blaster Savage4	31.3
Guillemot Maxi	
Gamer Phoenix 2	31.4

WinBench 99, MPEG-1 video, 30fps, 300K/sec: Max frame rate (frames/sec)

ATI Rage Fury	141
ATI Xpert 128	136
Diamond Stealth III S540	133
Creative Labs 3D	
Blaster Savage4	105
Joytech Apollo Savage4 Pro Plus	104
3dfx Voodoo3 3000	84.8
Gigabyte GA-660	84.7
Matrox Millennium	
G400 MAX	84.6
Joytech Apollo TNT2	
Vanta	84.3
Asus AGP-V3800 TVR	84.3
Asus AGP-V3800 Ultra	
Deluxe	84.1
AOpen PA3010N	84.1
MSI MS-8806	83.8
Leadtek WinFast 3D	
S320 II Ultra	83.8
Diamond Viper V770	74.9
Guillemot Maxi Gamer	
Xentor	74.7
Creative Labs 3D	
Blaster Riva TNT2 Ultra	74.3
Guillemot Maxi Gamer	
Phoenix 2	74.2
Diamond Viper V770	
Ultra	73.6

WinBench 99, MPEG-1 video, 30fps, 300K/sec: Frames dropped

3dfx Voodoo3 3000	0
AOpen PA3010N	0
Asus AGP-V3800	
Ultra Deluxe	0
Matrox Millennium	
G400 MAX	0
Asus AGP-V3800 TVR	0
ATI Rage Fury	0
ATI Xpert 128	0
Diamond Stealth III S540	0
Gigabyte GA-660	0
Joytech Apollo TNT2	
Vanta	0
Leadtek WinFast 3D	
S320 II Ultra	0
MSI MS-8806	0
Creative Labs 3D	
Blaster Riva TNT2 Ultra	121
Diamond Viper V770	121
Guillemot Maxi	
Gamer Phoenix 2	122
Diamond Viper V770 Ultra	123
Creative Labs 3D	
Blaster Savage4	124
Guillemot Maxi	
Gamer Xentor	124
Joytech Apollo	
Savage4 Pro Plus	126

## Disclaimer

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These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations as to the results. Test system specifications: Dell Dimension XPS-450, a 450MHz Pentium II with 128M SDRAM, 10.1G IBM-DDTA-371010 drive, FAT32 file system, Toshiba DVD-ROM SD-M1202, Turtle Beach Montego A3D running Windows 98.

The Ziff-Davis tests were performed at 1,024 by 768 in 16-bit colour. 3DMark was run at 800 by 600 in 16-bit colour. colour.



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## Apollo TNT2 Vanta

**Joytech**

Joytech was one of two vendors to submit cards based around the TNT2 Vanta chipset, which runs at a slower clock speed than the regular and Ultra TNT2 chipsets. At \$145, the Apollo TNT2 Vanta is the cheapest of all the cards we reviewed. For such an inexpensive card, it performed very well, although it was a little weak on the 3D graphics side.

Its performance in the Ziff-Davis WinBench 99 video tests was extremely good. It did not drop any frames when playing Indeo and MPEG-1 video and did not overly tax the processor. Its scores in the Business and High-End Graphics WinMark 99 tests were very close to average, although its 3D WinBench 99 score was not very exciting. In almost all the tests it performed better than the other TNT2 Vanta-equipped card, the Guillemot Maxi Gamer Phoenix 2, which was also more expensive.

Josh Mehlman

<b>Distributor</b>	Global Business Technology
<b>Phone</b>	(02) 9644 3900
<b>Online</b>	<a href="http://www.gbt.com.au/">http://www.gbt.com.au/</a>
<b>Price</b>	\$145
<b>In short</b>	A good choice for the budget conscious.

## WinFast 3D S320 II Ultra

**Leadtek**

Leadtek has included nVidia's top-of-the-line Riva TNT2 Ultra chipset in this \$399 card, and it is significantly cheaper than any other card using the Ultra chip. However, if you compare it with similarly priced cards, it offers no great surprises.

This card sits at the middle of the field in price and performance. It put in a good showing in the Ziff-Davis Business and High-End Graphics WinMark 99 tests, demonstrating its strong 2D graphics capabilities. Its very strong 3D capabilities showed through in its 3D WinBench 99 result, and its video playback capabilities were also very good.

It was consistently a step or two ahead of the equally priced Diamond Viper V770, which is expected as the Diamond card has a regular TNT2 chip. The ATI Rage Fury is \$30 cheaper, and while its performance in 2D graphics was unspectacular, it soundly beat the Leadtek card in the 3D graphics and video tests.

Josh Mehlman

<b>Distributor</b>	BCN Technology
<b>Phone</b>	(02) 9417 3688
<b>Online</b>	<a href="http://www.bcntech.com/">http://www.bcntech.com/</a>
<b>Price</b>	\$399
<b>In short</b>	Strong but not spectacular.

## Millennium G400 MAX

**Matrox**

This card simply blew us away. Its 3D WinBench 99 score was nothing short of astounding, and image quality was excellent. We were impressed when the Asus AGP-V3800 Ultra Deluxe cracked the 900-point mark, but the G400 smashed it with a score of 933.

In the Business Graphics WinBench 99 test, the G400 also led the field with the highest score, and was a close second in the High-End Graphics WinBench 99 test. It was the card that put the least strain on the processor when displaying full-screen video, achieving a good frame rate without dropping any frames.

The card also features two CRT chips and VGA outputs for simultaneous display on two screens at different refresh



rates and resolutions. This makes the G400 more accessible for the graphics professional, rather than focusing solely on the gamer. An S-Video and video-out adaptor dongle is included.

Darren Ellis

<b>Distributor</b>	Focal Point Computing
<b>Phone</b>	(03) 9525 1144
<b>Online</b>	<a href="http://www.matrox.com/g400/home.htm">http://www.matrox.com/g400/home.htm</a>
<b>Price</b>	\$495
<b>In short</b>	Definitely a winner all round.

## MS-8806

**MSI**

The evocatively named MS-8806 from motherboard manufacturer MSI is a good no-frills upgrade. At \$250, it is certainly the cheapest card in this review based on the regular nVidia Riva TNT2 chip,

## Editor's Choice

### Matrox Millennium G400 MAX

#### Highly commended

Joytech Apollo TNT Vanta  
Asus AGP-V3800 Ultra Deluxe

We received the Matrox Millennium G400 MAX rather late in our testing period, and in a very short time it changed the whole outcome of this review. It blitzed every other card in the 3D WinBench 99 test and proved to be powerful in other areas. Its dual monitor support was also unsurpassed.

The Joytech Apollo TNT2 Vanta card was the cheapest in this review. Although its performance wasn't up with cards with higher specifications, it certainly represents good value for money, especially for those on a budget.

We also have to commend the Asus AGP-V3800 Ultra Deluxe for its great test results and the best set of VR goggles and utilities we've seen. The onscreen display for the glasses is great, but unfortunately it's priced out of the running for the Editor's Choice designation.

although cards based on the somewhat underclocked TNT2 Vanta chip are a little cheaper.

Although inexpensive, it was a strong performer in almost all of the tests we ran. It was particularly strong in video playback; it put very little strain on the processor while running the tests and didn't drop any frames in the process. Its 2D graphics capabilities were also very good. It scored very highly in the Ziff-Davis Business and High-End Graphics WinMark 99 tests and was beaten only by more expensive cards. Its 3D performance was close to average, but again very good for the price.

The MS-8806 has very little in the way of bundled software, but it's cheap enough that you could buy some games with the spare change.

Josh Mehlman

<b>Distributor</b>	MSI
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# What's the colour of money?

Anybody looking for a printer for the home or small office will no doubt be tempted by colour. Even the plainest of text documents can be radically smartened up with a splash of colour. Add colour graphics and pictures and the world is your oyster. But that nagging old question still remains: can you get decent quality at a discount price? Jeremy Torr investigates colour printers that cost less than \$1,000.

If you have \$1,000 to spend on a colour printer today, you have the world at your feet. Never before has the competition in the SOHO colour printer market been so fierce. Costs have plummeted; you can now get a very decent machine for well under \$500, and the image quality will rival that of your local photo lab. Most colour printers are extremely tempting and many come with a swag of bundled software, but two factors need to be kept in mind: running costs and speed.

Most makers have attacked the speed aspect quite vigorously. As our tests show, Epson in particular sets a blazing pace for standard printing that rivals many lasers and lays down a real desktop speed challenge. Despite this, and what the makers tell you, photo-quality print speed is still generally slow. If you want colour in anything less than a few minutes, the entry-level colour market is not generally the place to find it. There is an emerging category of budget specialist photo printers. These print photos much faster, but we've reviewed these separately on page 132.

The other consideration, running costs, is not appreciated by many people until they need to replace the car-

tridge or ink head. Having to shell out up to 30% of the cost of the new machine often comes as a bit of a shock, especially as rated cartridge outputs are usually measured in the hundreds rather than thousands of pages.

Again, before you buy make sure the running costs won't outweigh the initial low purchase price. Some makers separate the ink tank and nozzle head to keep prices down, but this can mean an extra hip-pocket hit every six tanks or so. In some cases it could be more cost-effective on a long-term basis to opt for a more expensive colour laser printer.

If you concentrate purely on cost and speed, you are missing the point with these units. They sell spectacularly well because they are simple, compact and mostly provide very good colour. They all cope very well with standard letter and chart requirements, and print photos good enough to frame.

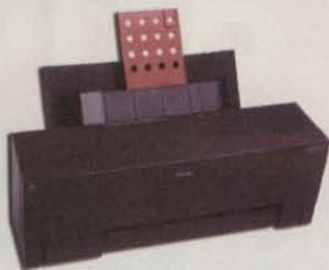
With new techniques such as special multi-colour photo cartridges, variable dot sizes, ink stabilising and drying additives, and dot layering — not to mention increasingly sophisticated software drivers to maximise the

clarity of the prints — most current desktop colour printers offer a real possibility of photo-quality digital output. The quality from all the samples reviewed was at worst good and some offered outstanding results.

However, the best quality always comes from using the maker's recommended paper, which is generally less convenient and more costly than plain paper. Luckily most manufacturers have realised plain paper use is a big issue and have put considerable effort into this area. Plain paper used to print from first-generation colour printers would result in Rorschach-like blobs and little else. Today's offerings are all capable of good output on plain paper and some (especially the Hewlett-Packard DeskJets) can produce output that compares quite favourably with photo paper samples.

But the main issue with any of these colour printers is horses for courses. If you want large print runs with big colour splashes — and fast — they will leave you wanting and very light in the wallet. If you want cheap access to high quality prints of the kids, the occasional proof print of a digital photo and moderate quantities of text documents, they have no equal.





MD-1000

## Alps

Hey, what's this... a desktop printer that isn't cream coloured? The Alps MD-1000 immediately distinguishes itself from the crowd with its sharply styled, squarish charcoal casing and caramel sheet feeder. It also uses a completely different printing technique from the rest, employing four small tape cartridges that are used sequentially to transfer heated dot pigments onto the paper. This has the advantage of offering waterproof and colour fast prints, which never bleed or smudge. It does, however, mean sequential printing of the four (CMYK) colours with associated paper runs backward and forward under the print head. This is completely automatic, but extends print time correspondingly. Plus all that spooling and swapping over of tape cassettes is about as noisy as they get.

Another advantage is that the printer can use clear film, metallic film or even white film to give a vast variety of printing effects suitable for transfers and T-shirt iron-ons. Alps claims maximum quality is 1,200 by 600dpi, and 600dpi on plain paper.

Setup is a bit more tricky than most inkjets as a result of the multi-cassette installation, but the software loads off floppy very rapidly. The paper feed tray looks humungous but only takes 100 sheets (the same rated number as each cassette) and there is no collection tray — the paper just flops out on the desk. Controls are simply power on and feed, and a few discreet LEDs indicate status feedback.

The standard MD-1000 is Centronics-equipped, but a Mac interface snaps on if required. No data cable is supplied. The manual is definitely above average in both clarity and comprehensiveness.

Print tests proved the multi-pass print approach is much slower than inkjets. The text-only page took one minute and 13 seconds, but with very crisp results when reasonable paper was used. But mix a little colour graphics and text and the Alps starts to grind very slowly — three minutes and 27 seconds to be precise. This was where slight band-

ing started to creep in too, especially on flat tones. Moving to the test photo proved even more yawn-worthy. The overall time for the four-pass exercise was 10 minutes and 42 seconds, and colours were nowhere near as rich as the other heat transfer machines. Flat, rather dark, still some banding and with much less tonal range — although the application of gloss film over the top did spruce things up. Good for T-shirts and transfers, the Alps offers durable and wide-ranging print options.

**Distributor**  
**Phone**  
**Online**  
**Price**  
**In short**

Star Micronics  
(02) 9748 4300  
<http://www.alpsusa.com/>  
\$699  
An interesting alternative to the inkjet. Reasonable quality, cheap media and consumables, good ink variety, but very noisy and relatively slow.

## BJC-4310SP

## Canon

Regardless of its output, many users would still buy this printer because of its stylish looks and affordable price. Easily the most compact of the inkjets, the BJC-4310SP crams a slot-in power supply module, three-plus-one ink cartridges and a feed tray into a tiny footprint less than half the size of the Epson Stylus 900. The printer can also accept a snap-in optical head to scan images to the PC if required.

The ink cartridges were some of the smallest in this review and less likely to last than those of the Epsoms or Hewlett-Packards. Canon claims the black cartridge prints more than 3,500 pages when used in super economy mode. The BJC-4310SP uses drop modulation technology to offer two different dot sizes for better economy and increased definition.

In terms of speed and quality, the Canon was quite reasonable. Text output was 25 seconds. There was very good clarity and no jaggies. Moving to DTP gave similar middle-of-the-road speed results, but with noticeable wet ink areas and slight bleeding on solids. Some post-drying flecking was also evident. When it came

to the photo test print, the BJC-4310SP offered surprisingly good quality. There was only slight degradation of shadow detail compared to the BJC-7100 — again with very good colour balance, although at a

## How we tested

Each printer was treated as supplied, using only materials and information supplied in the box. Consideration was given for ease of setup, installation and troubleshooting. The quality of the manual, quantity of supplied software and availability of connector cables were also assessed. Although USB connections are enabled on some of the review models, all were tested using bidirectional parallel print cables to ensure uniform print conditions.

Software drivers were individually loaded onto the test machine (a Gateway Profile 400MHz with 64M of RAM) and the print heads aligned and calibrated if possible. The host machine used three test files. The first was a standard A4 RTF text file, printed out in Times 10pt using WordPad. The second file was a page of mixed graphics and text created in Microsoft Publisher. This included a wide range of font types and sizes, watermark images and solid colour clip art and headlines. The photo file was a still life 3,010 by 2,007 pixel, 24-bit colour image taken from Canon's World Images CD, output via PhotoImpact 4. All tests were timed from the period when the software signalled printing had started or when paper feed commenced; spooling time was ignored. Timing finished when the printed page was ejected.

To ensure standard conditions, Reflex copier paper was used for the two initial tests. Kodak Inkjet Photo paper was used for the photo print test, although the Sony, Olympus and Polaroid machines' own paper packs were used. In most cases, slight improvements in quality will result from using the makers' own paper, but running costs will usually be higher. Prints were then rated for output speed, resolution, colour depth, tonal accuracy and speed of drying. Overall usability and cost comparisons were factored in to give the final printer ratings.

much longer print time (10 minutes and six seconds).

The package comes with a good manual, driver CD and disk, a spare black ink cartridge, a cartridge storage box and a 'Get you Going' startup sheet. Connection is parallel only, but no connecting cable is supplied. Loading the print driver crashed





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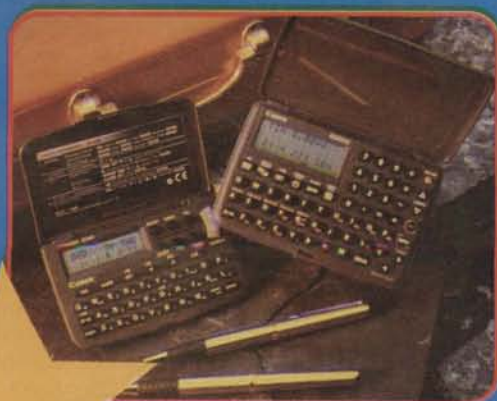
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our host machine twice — it obviously didn't like sharing disk space with other printer drivers. The software driver options are comprehensive in terms of paper type, image type and quality, although slightly confusing if you got the mix wrong.

Paper feed is through a 100-sheet semi-vertical tray and output is at the front onto a delicate looking output tray. Alternatively, thick stock or envelopes can be fed manually through a slot at the rear of the casing.

<b>Distributor</b>	Canon
<b>Phone</b>	(02) 9805 2000
<b>Online</b>	<a href="http://www.canon.com.au/">http://www.canon.com.au/</a>
<b>Price</b>	\$239
<b>In short</b>	When you consider the price, a very attractive package for home users. A well-balanced compromise between speed, quality and scanning expandability.

## BJC-7100

### Canon

Although the design cues are similar to the BJC-4310SP, the BJC-7100 looks more like the Epson Stylus Color 900 in overall appearance. It uses the Canon trademark button and light layout designed for simplicity and ease of use. The flip-up front cover houses a heavy-duty carriage for the twin cartridge ink housings. It uses the same clever snap-in power supply, and has only a parallel cable connection (a cable is included with this model). It is supplied ready to roll with both a three-colour and a photo-colour six-ink cartridge as well as the standard black. There's even a storage box for the cartridge that is not being used. Two CDs and a manual complete the package.

The printer driver loads from a very jazzy interface. It sets up the print head for horizontal, vertical, standard and bidirectional printing before it lets you loose on the actual print operations... after some protracted pump and nozzle priming, that is. Paper is fed through a 130-sheet hopper from above; thick sheets can be fed in the rear feed slot. The driver is extremely comprehensive, featuring options for almost every combination of cartridge, paper, bleed and image/text

data you can imagine. This can get a bit confusing, however, and most would probably opt for Auto or Default settings. When printing, the cartridge moves very rapidly. On our test model, the intensity of its action made the whole desk wobble. However, feed speed is much slower than the Epson Stylus Color 900. The text print took 22 seconds.

The ink system uses Canon's P-POP optimisation system designed for waterproofing and stabilising the ink droplets on plain paper. Canon has opted for a two-part cartridge that has a separate, replaceable 1,088-nozzle head and ink tank. The text quality was superb, easily the equal of laser. The DTP test page was also very sharp and clean, but took a tardy five minutes and two seconds to ooze out using the Auto setting. This did drop markedly to one minute and 18 seconds using the text setting, but with slight mottling on flat tone areas. The test photo print, although easily the fastest of the bunch at six minutes and 25 seconds, produced one of the most neutral and open images across the whole tonal range, with only a slight loss of definition in the lighter areas.

<b>Distributor</b>	Canon
<b>Phone</b>	(02) 9805 2000
<b>Online</b>	<a href="http://www.canon.com.au/">http://www.canon.com.au/</a>
<b>Price</b>	\$599
<b>In short</b>	A neat and capable operator, offering solid performance for the price.

## Stylus Color 740

### Epson

The Epson Stylus Color 740 has a similar shape to the Stylus Color 900 (reviewed below), but it has a noticeably reduced footprint. Epson hasn't shrunk the connectivity, however. It still has an extra USB port as well as parallel and Mac sockets.

The 740 retains the standard Epson button layout with a nozzle cleaning button, as well as feed and power buttons. The feed tray for the 100-sheet hopper and the output tray are more robust than the Lexmark and Canon offerings. The whole casing offers a more sturdy feel. No straight-through feed option is available for heavy papers.



The two-cartridge print head hides under a lift-up flap, using plain CMY and black for everything, including photo colour

printing. The standard package comes with a reasonable manual, power cord, pack of sample papers and a driver disk, but nothing else.

Loading the software updates the driver and installs the Epson status monitor for print progress, nozzle adjustment and general printer maintenance. The calibration utility is not automatically invoked like some other machines; it has to be run manually after new cartridges are installed. The standard cartridge offers 1,440 by 720dpi. It uses variable drop size, which Epson claims results in better ink consumption and less grain.

The 740 did provide a few obligatory snorting and shuffling noises on startup, but was pleasantly quiet while printing. Standard text page printing was impressively fast at 17 seconds, especially in the spooling area — there was noticeably less wait than with some of its competitors. Ink drying was not quite as rapid as the competition. There was a small amount of bleeding on low-quality plain paper. Solids were well handled on the DTP test, but with slight speckling on pastel tones. Again, it was extremely fast at 33 seconds. When the high-res photo image was run, the print spooler bled the image right to the edge of the standard paper, not centrally like most others. Slight speckling was evident on flat tone areas and the shadow detail wasn't quite up to the DeskJet standard.

Although it was fast at six minutes and 42 seconds, the ink drying time was noticeably longer than most. This caused some sheets to stick together after they had dried. Nonetheless, a solid all-round workhorse even if it's a bit expensive.

<b>Distributor</b>	Epson
<b>Phone</b>	(02) 9903 9000
<b>Online</b>	<a href="http://www.epson.com.au/">http://www.epson.com.au/</a>
<b>Price</b>	\$599
<b>In short</b>	Fast, neat, well-connected and quiet, the 740 does however lag slightly on the price/quality graph.

## Stylus Color 900

### Epson

There are no two ways about it; the Epson is a brick. Built like a tank, it's the biggest, heaviest unit we looked at. It has a massive cartridge carrier, a 100-sheet feed hopper, a selection of parallel, serial and USB interfaces, a built-in power supply, and even its own cooling fan. There is also a network upgrade option that extends its



capability to 10/100BaseTX capability too. It's a serious machine and takes up a considerable amount of desk space — especially with the retractable output tray extended. It also features a special inkjet cleaning facility.

Like the Stylus Color 740, it comes with a pack of special Epson high gloss paper to get you started. Software includes a driver CD and an online guide (also on CD) with some high-resolution images to test the printer. Set up and installation proved trouble free. The software loaded a print monitor utility in addition to the drivers, which cover Windows (3.x, 95/98 and NT 4.0), DOS and Mac on one CD. The software utility is less sophisticated, but is easy to understand and produces good results on default settings.

Once the cartridges are loaded, the machine makes much of purging and cleaning the 193 nozzles with accompanying clunks and whirrs. Printing is much quieter; just a slight whirring noise. The inks used were extremely fast drying. There was not a trace of smudging on flat solid areas. The printer driver was a bit slow sending everything down the cable, but once there, the print machinery is stunningly fast. The Stylus Color 900 claims a staggering 12ppm output. Combine that with variable droplet size and a minimum of three-picolitres droplet size and it should be pretty economical too.

The text test page hurtled through at a mere nine sec-

onds, well under half that of the nearest competitor, the Hewlett-Packard 880C. Quality was not compromised, however, and was still good even on cheap, plain paper. The DTP page was also very fast at 18 seconds and again, it offered very solid quality with seemingly faster ink drying than the 740. The test photo was surprisingly slower than the 740, but seemed to offer slightly less crispness and contrast than its little sister. Having said that, the 900 offers very neutral colour balance and a very open tonal range. In terms of bang for buck, it's hard to beat for office work.

<b>Distributor</b>	Epson
<b>Phone</b>	(02) 9903 9000
<b>Online</b>	<a href="http://www.epson.com.au/">http://www.epson.com.au/</a>
<b>Price</b>	\$899
<b>In short</b>	The 900 totally redefines fast, without losing quality on the way.

## DeskJet 710C

### Hewlett-Packard

The DeskJet 710C from Hewlett-Packard carries on a proud DeskJet tradition; it has the most circuitous paper path of any maker. The feed tray is under the output tray. Both trays face out of the front of the main casing and are adorned with plenty of hinged sliding flaps for catching printed pages. This means much better access to the media and the option of using continuous fanfold paper. But there is no chance of straight through for heavy stock printing, although Hewlett-Packard claims most envelopes are quite satisfactory as print

stock. Hewlett-Packard has added a trapdoor on the back to ease de-jamming recalcitrant sheets, but everything still happens from the front, so there's no chance of printing on card.

The twin cartridge head sits under a flip lid beside a two-button control panel. Another flip lid on the back hides the parallel socket and the power connection for the external power supply brick. The two cartridges are generous in size and they clip very easily into place. No printer cable is included, but you do get a good manual, drivers for all varieties of Windows and a spare ink cartridge. Surprisingly, no big instruction poster is included, but setup is very straightforward and poses no hurdles.

Software driver installation prompts an automatic print head alignment utility and then pops a DeskJet tools icon onto the desktop. Despite this, no automatic print status monitor is used (as with Epson and Lexmark) to keep an eye on print progress, which can be a nuisance if long runs are expected.

Printing was exceptionally quiet and the spooling process was lightning fast, especially with text-only documents. Hewlett-Packard claims up to 6ppm black and 3ppm for colour printing. Our test resulted in a 23-second text page with some of the sharpest and crispest text of any. Moving to the DTP page gave an output of one minute and 50 seconds, but with some wet ink on the flat tone areas. This didn't cause the bleeding the



I'm not totally sure how I ended up here but now that I'm here, I don't want to go man... can you dig what I'm saying? Bryson 10.35am Palm Beach.

getaway [ninemsn.com.au](http://ninemsn.com.au)





## Specialist photo printers

### Camedia P-330E

#### Olympus

The Olympus Camedia P-330E looks strikingly similar to the Sony Mavica printer. It uses the same print engine and the same paper and print system: a print film, heat transfer method. This allows it to achieve up to 306dpi on a maximum of A6 (100 by 140mm) paper.

It has both Mac serial and Centronics parallel ports on the back. The front panel is resplendent with buttons and control pads, sporting no fewer than 13 of each. This is partly because of the extra capability of the Olympus. Not only can you print directly from a PC, but the unit also has inputs for video and S-Video on the side that allows connection to camcorders and VCRs. Additionally, like the Lexmark 5770, the Olympus sports a RAM card slot on the front panel to take the SSFDC Smartmedia cards used in Olympus cameras. Unlike the Lexmark, there is no LCD to prompt the user, hence the proliferation of LCD status lights.

The box comes with connecting cables, one pack of paper, a spare print fill cartridge to slot in the side of the unit and a driver disk. Setup is very easy. Plug in, run the setup utility and pop the feed tray into the front slot. The printer warms up instantly and all prints take about two minutes, regardless of complexity. Like the Alps, the paper is shuffled back and forth under the print ribbon as the image is applied, colour by colour across the four CMYK colour films. Printing from a RAM card is rather slow due to loading time, but still reasonable.

Output quality is very good at 306dpi with a maximum of 1,024 by 1,376dpi. Time for the test photo image at the A6 maximum size was two minutes and four seconds, with very deep colours, and surprisingly good resolution and tonal range. Straight text suffers the same as the Polaroid however — only a small quadrant is output and took two minutes and 18 seconds for a few lines of text. Mixed text and graphics suffered even more, simply crashing the host PC every time. But if you are happy with postcard-size photo prints, the Olympus offers input versatility and image quality.



Distributor	R Gunz
Phone	(02) 9935 6600
Online	<a href="http://www.olympus.com/">http://www.olympus.com/</a>
Price	\$999
In short	Very versatile print device. Camera, PC, video and camcorder can all be used.

but there's size.

Quality is fine, only one image

### ColorShot PhotoPrinter

#### Polaroid

This is a very different colour printer. Using Polaroid's patent instant film technology, the whole print unit is slightly smaller than an external CD-ROM drive, powered by a compact external power supply. It comes bundled with a special parallel printer cable, printer drivers on CD, a pack of 10 instant print sheets and a copy of MGI PhotoSuite to tinker with original digital images. If you are merely looking to output images from your PC and aren't interested in large print size, it does the job. But try to print text and you'll be disappointed.

Because the feed tray that slides into the front of the box can only take Polaroid 75 by 90mm ColorShot print paper packs, that is the size of your print. If you try to print text, you'll get the top right-hand corner of the displayed page and nothing else. Print packs are the only ongoing expense at about \$2 per print.

The fairly primitive print driver doesn't allow paper, position or sizing to be altered in any way, but is definitely easier to use than the Olympus for a similar end result. Having said that, the overall speed for our test 18M file — which just squeezed under the ColorShot's 18M maximum size — was exactly the same three minutes that the few lines of text took.

As soon as the image transfer is finished (about 25 seconds), the print auto-ejects. Image colour quality was pretty reasonable given the size, but possibly a little dark overall. There was, however, excellent crispness and depth.

Distributor	Polaroid
Phone	(02) 9950 7000
Online	<a href="http://www.polaroid.com/">http://www.polaroid.com/</a>
Price	\$699



#### In short

Easy to use. But if you need anything other than colour photos, not the tool for the job.

### Mavica FVP-1E

#### Sony

Printing computer images on the Mavica can only be accomplished using a floppy disk as the transfer medium. An additional limitation is that many of the selection functions can only be used in conjunction with a TV set acting as monitor. However, using the FVP-1E with a Mavica digital camera is quite realistic, as the camera can be used as the image checking screen and the printer used simply to print from the camera's floppy disk.

The Mavica printer uses exactly the same engine and body format as the Olympus P-330E, but a 3.5in floppy disk slot replaces the SmartMedia SSFDC slot. Also, there are no serial or parallel connections on the back. The same video input and outputs are supported to enable stills to be captured by a camcorder.

The image selector dial allows the simple selection of index sheet, multipage, multi-image, several up or individual prints. The paper feed tray slots into the front of the unit and holds up to 30 sheets of special Sony glossy paper. The chunky film transfer cassette, like the Olympus, slots into a special housing on the right-hand side and comes with 50 sheets of paper.

Once an image has been shot on a Mavica camera (or shot, then edited on the PC then resaved to floppy), it can be loaded from the disk. This takes about 20 seconds.

Then the dial is set to select which image to output and the multi-pass print engine swings into action. Print time is two minutes and 42 seconds for an A6 image.



Distributor	Sony
Phone	(02) 9887 6666
Online	<a href="http://www.sony.com/">http://www.sony.com/</a>
Price	\$1,299
In short	Reasonable, but hampered by lack of connectivity and limited file size.





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Lexmarks showed, but could possibly give rise to smudging. Otherwise, the result was very smooth and crisp solids. Running the photo image test took 10 minutes and 30 seconds and produced a surprisingly sharp-looking, although slightly dark image. Shadow detail was good and overall clarity excellent with very neutral mid tones. Considering the price, the 710C gives truly outstanding all-round performance.

<b>Distributor</b>	Hewlett-Packard
<b>Phone</b>	13 13 47
<b>Online</b>	<a href="http://www.hp.com/">http://www.hp.com/</a>
<b>Price</b>	\$349
<b>In short</b>	Up with the best. Given the price, a real bargain in anybody's book.

## DeskJet 880C

### Hewlett-Packard

Slated as one of Hewlett-Packard's better quality inkjets for the home or small business user, the DeskJet 880C offers a few special attractions. First there is the inbuilt USB port and second is PhotoREtII photo realistic printing.

Like the DeskJet 710C, it uses Hewlett-Packard's unique front feed/load tray design. This means the 880C takes up surprisingly little desk space; there is no feed tray to extend out the back. The standard tray takes up to 100 sheets and, like the 710C, it can cope with continuous paper and envelopes despite its 180° paper path.



Setup is slightly fiddly because all the removable plastic panels are

held in place with sticky tape and the amazingly complex cartridge packs almost require a locksmith to open. Hewlett-Packard obviously doesn't want any unauthorised tampering with refills. Fitting the ink tanks requires a very firm hand to snap the tank lids in place — let's hope the support mechanisms are tough. The standard setup does not include either a parallel or a USB cable, so expect to pay another \$15 or so to get connected.

Once set up, the software locates and tests the machine and the connection, then runs a calibration applet. Although the machine comes with a very user-friendly set of tools and driver configuration applets, no other software or sample paper is bundled — a negative compared to some of its competition.

Controls consist of a couple of front panel buttons, one each for power and resume. Otherwise all controls are activated via the software, which comes in all Windows flavours as well as DOS.

The printer is dramatically quieter than some of its predecessors. The ink technicians have obviously done their job too; quicker drying, much less bleed on plain paper and faster solid tone application were all evident.

The straight text test took a creditable 21 seconds, making it the second fastest. Text was immediately dry and very crisp on fine serif letters — even on cheap paper. The DTP graphics and text page was also among the leaders in speed at 58 seconds, producing excellent smooth colour tones and solids, and not a hint of jaggies anywhere. The photo image was among the best in terms of maintaining detail in both shadow and mid tones, although the chromatic smoothness did tend to decrease the overall impression of crispness in hard detail areas.

<b>Distributor</b>	Hewlett-Packard
<b>Phone</b>	13 13 47
<b>Online</b>	<a href="http://www.hp.com/">http://www.hp.com/</a>
<b>Price</b>	\$499
<b>In short</b>	Moving towards the ultimate all-rounder goal, the 880C prints well, works fast and doesn't cost a bomb.

## Lexmark 3200

### Lexmark

Based on Lexmark's trademark bulbous chassis, the Lexmark 3200 Color Jetprinter is a medium level printer at a shade under \$350, yet still offers acceptable quality along with a high degree of simplicity.



Unpacking and setting up is very easy — the hardest thing is trying to grip the two ink cartridges by the little spigots

when you slot them in place. Access to the cartridge holders is also well thought out: just lift the front cover and the carriage is immediately visible. Paper feed adjustment and positioning is neat and simple. There are only a few levers to adjust and there is a clever flip-down feed tray for continuous paper (if you still have any). The heavy and bulky external power supply offers a jarring design note, but at least the lead is long enough to hide it under your desk.

The supplied software is good, if not design-house quality, and there is plenty of it too. Micrografx Draw and a Greeting card maker are bundled, along with Lexmark's very usable and adjustable printer driver, which can cope with all Windows versions from 3.1 right up to NT 4.0. A parallel printer lead is supplied with the

## Results and specifications: Colour printers

Model	Maker	Contact	Price	Max resolution (dpi)
M-1000	Alps	(02) 9748 4300	\$699	600 by 1200
BJC-4310SP	Canon	(02) 9805 2000	\$239	720 by 360
BJC-7100	Canon	(02) 9805 2000	\$599	1,200 by 600
Stylus Color 740	Epson	(02) 9903 9000	\$599	1,440 by 720
Stylus Color 900	Epson	(02) 9903 9000	\$899	1,440 by 720
Deskjet 710C	Hewlett-Packard	13 13 47	\$349	600 by 600
Deskjet 880C	Hewlett-Packard	13 13 47	\$499	600 by 600
Lexmark 3200	Lexmark	1300 362 192	\$349	1,200 by 1,200
Lexmark 5770	Lexmark	1300 362 192	\$699	1,200 by 1,200
<b>Specialist photo printers</b>				
Camedia P-330E	Olympus	(02) 9935 6600	\$999	306 by 306
ColorShot	Polaroid	(02) 9950 7000	\$699	160 by 160
Mavica FVP-1E	Sony	(02) 9887 6666	\$1,299	306 by 306



package, saving you extra outlay and frustration when you get home.

Once set up, the 3200 clunks and creaks briefly, warming up noticeably quicker than some others, then flashes its ready light. The only controls are the power and line feed buttons, each with its own LED. Print speed on plain paper was not brilliant. Plain text took 58 seconds, well below average, but it produced good quality and no smudging. The graphics and text test page was slightly better at one minute and 44 seconds. It produced brilliant colours, pin sharp text and solid fills, but there was a slight tendency to bleed while still wet.

On photo paper, the quality was good, but a little on the dark side of neutral. Resolution was reasonable, but nowhere near as good as the cost-comparable DeskJet 710C and with slight mottling on flat pastel areas. And at 23 minutes and six seconds to print the A4 photo test, it was also abysmally slow. For letters and basic DTP, it is a solid unit, but it's not so hot on quick, top-quality photo prints.

Distributor	Lexmark
Phone	1300 362 192
Online	<a href="http://www.lexmark.com/">http://www.lexmark.com/</a>
Price	\$349
In short	An engaging and chunky first-time performer. Extremely easy to use, but not at its best on photo printing.

## Lexmark 5770

### Lexmark

Although not unlike the 3200, the Lexmark 5770 Color Jetprinter has a secret weapon on its front panel. First an LCD readout screen surrounded by function buttons and most remarkably, a few small slots above the LCD on the left-hand side. These slots are specifically for one task —

to support flash RAM cards. Both CompactFlash and SSFDC (SmartMedia) cards can be inserted and their contents loaded into the printer and printed directly without the need for a computer to relay the image data. Although the 5770 only offers a parallel connection, it can also use direct image loading by linking straight to a Zip drive if required.

The 1,200dpi print heads are fed by two cartridges, one three-colour and one photo-colour; a black cartridge is not supplied. A parallel cable, a pack of paper, driver disks, a power lead and a cartridge storage box complete the package.

Setup is not too tricky, although some stages such as loading the cartridges have to be performed in exactly the right order to avoid confusing the software. A head alignment utility swings automatically into action once it is loaded. The print driver utility itself is very neat and well designed. It offers excellent feedback on all aspects of paper, image, quality and print progress, and provides good customisation if required.

Direct printing from RAM cards using the front panel LCD and controls is slightly fiddly; there are lots of double-presses and cascaded selections. Loading and printing from the cards was also rather slow and direct editing even more so, because the manual had to be on hand all the time. Operation was generally quiet after some slight initial clunking.

The print speed was good at 49 seconds for the text page, although it was not quite as crisp as some. Mixed text and Graphics produced some excellent tones and solid colours at a decent rate of one minute and 44 seconds for the page,



## Editor's Choice

### Hewlett-Packard DeskJet 710

#### Highly commended Epson Stylus Color 900

The overall performance of a printer is a mix of many factors. The quality of the Epson Stylus 900 is superb and the output speed a light year ahead of the competition — although the photo output onto Kodak Inkjet paper wasn't the fastest. The Canon BJC-7100 blazed through the photo test but slowed dramatically on DTP work. The Alps MD-1000 produced brilliant metallic prints on almost any medium, but was slow and noisy. Taking into account speed, all-round print quality, initial cost and replacement ink costs, the Hewlett-Packard DeskJet 710 hits the winners tape first with an excellent mix of usability and value.

although with some slight bleeding on plain paper. When it comes to photo quality, however, it's time to put the kettle on. It took 15 minutes and 52 seconds before we saw the finished item, albeit with excellent shadow detail, if a little flat in the lighter areas. Contrast was less than some, but overall detail and colour balance were still good. Given the versatility of input options and the solid everyday performance, it is good value.

Distributor	Lexmark
Phone	1300 361 192
Online	<a href="http://www.lexmark.com/">http://www.lexmark.com/</a>
Price	\$699
In short	Innovative use of the latest technology plus reasonable quality. Print quality up there with the frontrunners.

Connection	Text print time	DTP print time	Photo print time	Black cartridge	Colour cartridge
Parallel	1:13 (minutes:second)	3:27 (minutes:second)	10:42 (minutes:second)	\$12	\$12
Parallel	0:25	1:48	10:06	\$65	\$54
Parallel	0:22	5:02	6:25	\$90	\$57
USB, parallel, serial	0:17	0:33	6:42	\$60	\$56
USB, parallel, serial	0:09	0:18	10:03	\$60	\$80
Parallel	0:23	1:50	10:30	\$42	\$72
USB, parallel	0:21	0:58	9:49	\$42	\$72
Parallel	0:58	1:44	15:52	\$65	\$73
Parallel	0:49	1:44	15:52	\$65	\$73
Parallel, serial, video	2:18	N/A	2:04	N/A	N/A
Parallel	3:00	3:00	3:00	N/A	N/A
Video, S-Video	N/A	N/A	2:42	N/A	N/A



# Workshop

136 APC Magazine

CONTENTS

Welcome to Workshop, the section dedicated to bringing you all manner of tips, interesting information and do-it-yourself tutorials. Within these pages you will find useful shareware, informative operating system-specific columns and in-depth programming tutorials.

All files mentioned in Workshop can be found on [apcmag.cd](http://apcmag.cd) or downloaded from our Web site at <http://apcmag.com/>. You can join one of our online discussion forums to discuss technical issues or just voice your opinion on any related topic.

Workshop is a reader-input section. Please send us your ideas, comments or criticisms via email to [workshop@acp.com.au](mailto:workshop@acp.com.au), or snail mail to APC Workshop, 102 Toorak Road, South Yarra, Victoria 3141.

A full archive of Workshop articles can be found online at <http://apcmag.com/workshop>.

Stephen Withers, Workshop editor

## Tech Talk

Technobabble explores the looming world of digital TV, while Step by Step lays to rest some common misconceptions and myths.

## Operating Systems

The Windows 98 column teaches you how to store Web pages for offline use. OS/2 tells you how to update your system using fix-paks. In Mac OS you'll discover some new features of Mac OS 8.6, while the Linux column teaches you how to secure your system.

## Programming

This month's Simple C++ column discusses string comparisons and memory allocation, while the basics of creating Web applets are covered in Java.

## Shareware Summary

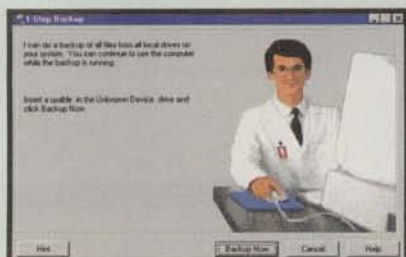
All the files mentioned here can be found in the Workshop section of this month's [apcmag.cd](http://apcmag.cd).

## Bug the Month

It has been a lean couple of months for bugs and I thought I'd have to keep those neat software prizes for myself. But Chris Blake sent us some stories about his adventures with Windows NT, in particular a little trouble he had getting it to communicate with an Iomega Jaz drive. Just when he thought he had it working, Windows produced one of those ever-so-helpful error messages and Chris was alert enough to capture it for posterity.

Haven't you always wanted to "insert a usable in the Unknown Device drive"? He was probably wise to not ask for the Hint.

For his diligence, Chris gets a choice



from the Workshop lucky dip of expensive software.

## Win! Win! Win!

Workshop is always on the lookout for interesting, strange, funny or downright weird software bugs. These include code snippets, examples of poorly functioning features, or procedures for crashing a particular application. Anything that is buggy deserves mention.

Send us your favourite bug via email to [bugs@acp.com.au](mailto:bugs@acp.com.au) or snail mail, and you'll be in the running to win a software prize. Please send screen captures, example code listings or detailed instructions to trigger a bug in an application, as appropriate for your entry.

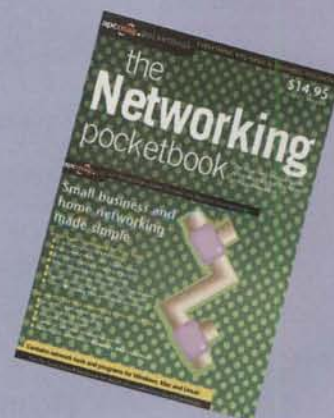
The winner's name, along with details of the bug, will appear in the Bug of the Month column in the September edition of APC. Rush those entries in so we can give away more software next month! Michael Smith

## Pocketbooks

For those of you who have thought about building your own network but feel daunted by the task, the *Networking Pocketbook* provides a clear and concise guide to setting up, managing and making the most of a network tailored to home or small business needs.

The *Networking Pocketbook* comes with a cover CD packed with the best networking tools and utilities for Windows, Mac and Linux.

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The response to the Pocketbook series so far has been phenomenal, and we're excited about the latest in the series, the *Y2K Emergency Pocketbook* and the *Networking Pocketbook*, both of which are currently available.

We've also had many emails and phone calls asking if we are going to release a new version of the *Linux Pocketbook* with Red Hat 6.0 on the cover. The answer is yes, and the *Revised Edition Linux Pocketbook* is in production as we speak. Look out for it soon!

If there is a specific topic or subject you'd like to see covered in Pocketbook format, please email [amills@acp.com.au](mailto:amills@acp.com.au).

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An introduction to the next big thing on television: digital.  
By Nathan Taylor

## Technobabble

Following last month's article on MPEG, let's take a look at one of the specification's biggest potential markets: digital television (DTV). MPEG has already been universally accepted as a standard to deliver the digital terrestrial television broadcasts (DTTBs) that will eventually replace the PAL television system we have today. It's the first real revolution since TV was introduced over 40 years ago.

As of January 1, 2001, all free-to-air television broadcasters in Australia will be simulcasting their normal channels in high-quality digital format. Some satellite broadcasters are already using it. It promises a lot, but we'll have to wait until it's implemented to see if it delivers.

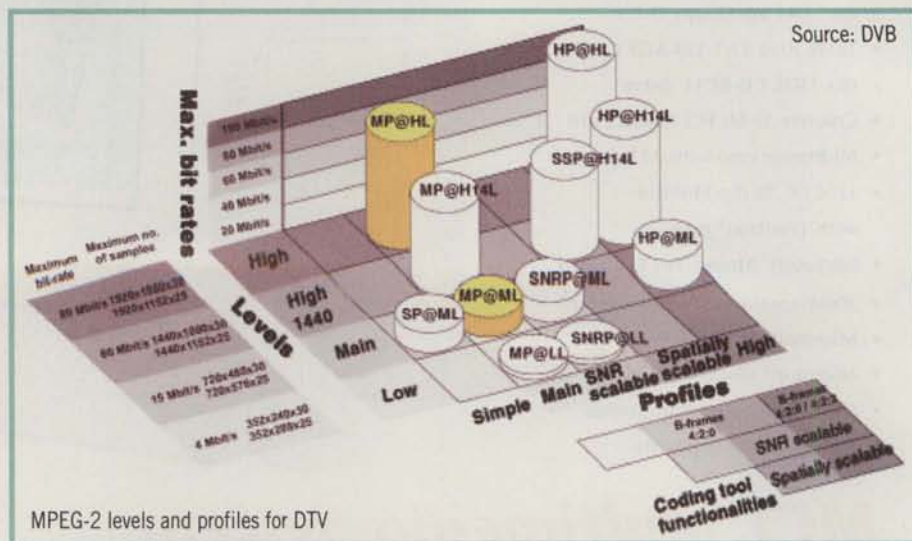
### The PAL system

Current television broadcasts in Australia use the PAL (Phase Alternating Line) system, which delivers an analog signal of interlaced video at a resolution of 625 horizontal lines at 50 interlaced fields per second (or 25fps — frames per second). Because it is interlaced, it does not have the crispness of a monitor screen, but edges are not jagged either.

For the most part, channels are spaced 7MHz apart and are located in the VHF and UHF spectrum bands, which range from 45 to 820MHz. This means that every free-to-air broadcaster has 7MHz in which to transmit its TV channel — so the ABC, for instance, transmits its signal in the bandwidth between radio frequencies 63MHz and 70MHz, which our televisions are programmed to recognise as channel two.

### So what's DTV?

Simply put, DTV is MPEG-2 encoded video, broadcast over the airwaves in digital form and then decoded and displayed at the receiver. Work on DTV even spawned a new MPEG standard, MPEG-3 (not to be confused with MP3) which was later folded into the MPEG-2 standard. There are a



number of good reasons to replace our current analog system; DTV delivers a higher quality picture, makes datacasting feasible and saves bandwidth.

The quality of digital broadcasts is similar to DVD movies: there's no snow, ghosting or other interference and the sound is crystal clear. And that's at the same resolution as your normal television broadcast. Seeing high-definition television (HDTV) is something else. HDTV has more than four times as many pixels as standard definition television (SDTV), which is truly spectacular. It almost looks like a photograph, even when projected onto a large screen.

DTV signals suffer from the *cliff effect*. Either you receive the whole signal or you don't receive any signal at all. There won't be any 'fading' on the edges of reception zones, but once you go beyond the range of the signal or the signal is hindered, it instantly disappears.

Using a digital system for transmission of television also paves the way for *datacasting*, the delivery of data over the same medium. A number of vendors are already working on systems that deliver program-associated data, applications, Web pages and files over the airwaves.

These benefits are significant, but the real motivation to move to digital is spectrum. MPEG-2 encoded video is much more bandwidth-efficient than PAL video, so much so that the amount of spectrum used to transmit a single television channel today could deliver four or more SDTV channels. Alternatively, broadcasters can use the bandwidth to vastly increase broadcast quality and deliver HDTV signals. One possibility is that broadcasters will choose to rely on SDTV for the most part (giving us up to four stations per channel — so Channel 9, for instance, could have 4 shows on at once), and then switch to a single HDTV show for blockbuster movies or major sporting events.

### DTV in Australia

A regulatory framework has already been established for DTV, and standards and time frames have been set for DTV's introduction in Australia. For a start, we will implement a standard based on a specification from the European Digital Video Broadcasting (DVB) group. The specification, DVB-T, details modulation schemes, resolutions and multiplexing systems for terrestrial television broadcast. The DVB



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also has a number of other specifications for satellite and cable delivery of video, datacasting, return channels and so forth which are likely to be implemented in Australia in the future. Australia will also use Dolby's AC-3 system for audio.

The key to the DVB specification is a digital modulation scheme called Coded Orthogonal Frequency Division Multiplexing (COFDM). It sounds as complicated as it is, but basically it's a system which uses large numbers of carriers to provide robust transmission of digital signals. It's highly flexible, so signal robustness can be traded for bandwidth, and it will be largely up to broadcasters to determine the trade-off they want to make. Most broadcasters are expected to choose a configuration that provides about 20Mbps in Australia's 7MHz bands — enough for one HDTV channel or about three or four SDTV channels.

HDTV signals are likely to be broadcast at 1,920 by 1,152 or 1,920 by 1,080 at 25fps in a resolution/compression scheme known as Main Profile@High Level (MP@HL) in MPEG parlance (see APC July, page 138). SDTV signals, multiplexed into a single-channel band, will be at the current PAL resolution of 720 by 576 at 25fps, a resolution known as Main Profile@Main Level (MP@ML). The DVB standard allows for some other resolutions, including 1,440 by 1,152 with different compression levels, but it is unclear whether these will be used.

What is clear is that the television sets most of us use won't be able to accept DTV, thus requiring some kind of upgrade. Set-top boxes, which convert digital signals into PAL signals, will be available, but these won't let you benefit from the higher quality of DTV, only the (potential) extra channels. Initially, proper DTV sets will be available, but expensive because of the need to support the higher resolution of HDTV and the new chips required to decode MPEG and receive COFDM signals. Most DTV screens will be hybrids, capable of receiving both PAL and DVB signals.

The other problem concerns wide-screen viewing. We currently use television screens with a 4:3 (1,440 by 1,152 resolution) aspect ratio, yet the 1,920 pixels per line HDTV specification calls for a 16:9 aspect ratio, in which most DTV screens will be made. SDTV signals will continue to be broadcast in 4:3. Consequently, the transition period to 16:9 will be ugly. Watching a 16:9 picture on a normal 4:3 television will produce big black bars at the top and bottom of the screen, while watching a 4:3 image on a 16:9 screen will leave chunks of screen unused at the sides of the image.

## Australia and the rest of the world

The good news is everybody is planning to use MPEG. The bad news is there are multiple modulation schemes which will make televisions incompatible. The *modulation scheme* — the means by which digital information is transmitted over the airwaves — is the other key component to DTV. Despite the best efforts of the International Telecommunications Union (ITU) to negotiate a standard system for digital broadcasting, a rift has developed that mirrors the current problems we have with incompatible NTSC, PAL and SECAM standards.

The main battle lines have been drawn between the US and Europe, the former preferring a modulation system developed by the Advanced Television Systems Committee (ATSC) and ratified by the FCC in the US. Europe (and Australia) prefer a system developed by the Digital Video Broadcasting (DVB) Project.

Both groups have been trying to sell the technical merits of their specifications, despite the fact that most of the reasons for the dispute are political. US company Zenith owns most of the intellectual property behind the ATSC modulation system (called Vestigial Side Band, or VSB), while the method favoured by the DVB is the European-developed COFDM.

Each modulation has its advantages: DVB is more flexible and robust in regards to multipath (bouncing) signals, while ATSC is less susceptible to interference in other ways. Both can support a variety of resolutions and frame rates, although Australia is one of the only countries in the world that has an interest in developing HDTV services on DVB-T (most European development is focusing on digital SDTV), which could prove critical when it comes to the availability and cost of receivers.

There are also differences in each group's choice of supported resolutions.

For instance, while the ATSC has set 1,920 by 1,080 at 60Hz as the highest supported resolution, the DVB's HDTV specification calls for 1,920 by 1,152 at 50Hz for the highest-quality broadcast. This distinction causes further problems in terms of the aspect ratio of pixels, as the horizontal resolution is the same, but the vertical is not (the ATSC uses square pixels; the DVB pixels are slightly wider than they are tall). This means the same image will look different on both systems — a huge hurdle for those wishing to produce hybrid TV/computer displays, as software will have to be altered to fit the different resolutions and pixel aspect ratios. Fortunately, the ITU has called for the US and European parties to standardise on a Common Image Format of 1,920 by 1,080, and the DVB is moving to support it.

Most of Europe's broadcasters have already decided on DVB as the standard for the region, with backers in Russia, Japan and the Middle East. Its foothold in North America is minimal, limited mainly to satellite carriers (using a standard known as DVB-S, also based around COFDM). The FCC has officially ratified the ATSC specification as the US standard, and Canada is following suit. Taiwan, Argentina and South Korea have also decided to use the ATSC system. Much of South-East Asia is still undecided and is being courted by both European and US interests.

Japan is an interesting case. The national broadcaster, NHK, has been transmitting HDTV signals for some time but using an analog system; similar to existing NTSC broadcasts but delivering much higher resolutions. It has only recently begun investigating its digital transmission options. As the world's largest producer of consumer electronics, Japan's decision will be vital to the future of DTV.

For computer users, the transition to DTV will be a good thing, not only from the perspective of datacasting. Computer and television screens may well be interchangeable, and consequently their prices could fall.

In Australia, as in the US, the commercial television broadcasters have convinced the government of the need for free chunks of spectrum in which to develop digital broadcasting services. This bandwidth was granted on the condition that broadcasters use it to simulcast their existing free-to-air

stations digitally. Such simulcasts will start in 2001 in metropolitan areas and continue until 2009, when analog transmissions will cease and the spectrum used for those channels is returned to the Australian Communications Authority. Aside from the need to simulcast, broadcasters have been left free to develop other services, including datacasting, on their digital channels as long as they pay the appropriate licensing fees. Whether or not they will remain to be seen. ■



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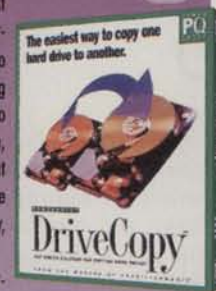
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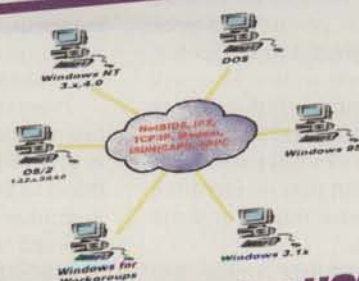
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How to spot some old myths and hoaxes, and how to pick the new ones. **By Daniel Rutter**

# Step by Step

Since most computer problems are resolved either by random or ritualistic action on the part of the user or by following mysterious instructions from an allegedly knowledgeable support person, it's hardly surprising that there are lots of pseudoreligious myths about PCs. These stories can waste a lot of time and money. Worse yet, you could become one of the myths' promulgators, effectively exacerbating the problem.

This column is partly about the worst of these myths, but it's also about how you can spot misconceived ideas yourself and where you can find accurate information about your computer.

## Everything's a virus!

The most common PC myths concern viruses. Novice computer users are renowned for assuming viruses are the cause of everything that goes wrong with their PCs. Misguided virus warnings are one of the most popular kinds of non-commercial junk email. Many of these warnings clearly originate as a joke (such as an email titled "Pen Pal Greetings!" that warns you never to open an email titled "Pen Pal Greetings!"). Not knowing what their computer can and can't do, users forward the 'warnings' promiscuously.

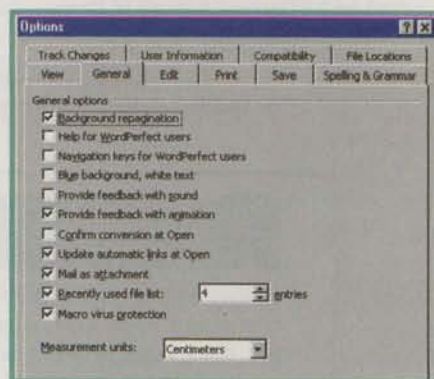
It has recently become possible for email to be harmful. 'Rich media' email clients, especially those produced by Microsoft, have far more complex capabilities than ordinary text-viewing email clients such as Eudora. By means of legal function calls or unintended weaknesses, these overpowered clients can do strange things, such as crashing when they receive an HTML email message that's malformed (possibly maliciously) in just the right way.

Far more common are email pseudo-viruses like the recent Melissa virus, which are part Microsoft Word macro virus and part Trojan horse. They pretend to be something innocuous, but aren't. Unlike a true virus, they have to be specifically run by the email recipient before they can do their thing.

Melissa turns up in an email message as an attached Word document. If you're foolish enough to open it and allow Word 97 or 2000 to run the macros in it, Melissa infects every Word document you subsequently

save, turns off the default 'do you want to run macros' warning in Word and, if you're using an appropriate Microsoft email client, automatically emails itself to 50 of the email addresses in your address book. This is an extension of the behaviour of the earlier Happy99, a program that sent itself to numerous people via Microsoft email clients when you ran it and produced some pretty animated fireworks.

If you don't enable macros in a Melissa-infected document, it can't do a thing. Make sure you've got the macro warning feature turned on in Word — although it's activated by default, the procedure for checking or changing the setting is different for Word 97 and Word 2000. In Word 97, select Options from the Tools menu, click the General tab and make sure 'Macro virus protection' is checked. In Word 2000, select Macro from the Tools menu and then click the Security option. The Medium security setting works the same way as Word 97's protection.



Currently, these macro viruses are restricted to Microsoft software on PCs. Its popularity, feature-rich nature and poor security makes it a great target. So far, macro viruses have been written to attack Windows-based computers, but they are also spread by Word and Excel 98 for Macintosh. Similar weaknesses have also been detected in Corel's Script files — anything with a similarly powerful macro or script language is susceptible.

Avoiding viruses is fairly simple: use antivirus software and keep it updated; don't run mysterious programs sent to you by email; and don't run macros in unknown documents in Microsoft Office programs. Remember, simply reading an

email message won't infect your computer with anything.

Although viruses which are alleged to physically damage hardware can be hoaxes, some can be harmful. A virus like the widely found CIH, for example, can wipe many computers' BIOS chips. This is a bad thing if you've got a late-model motherboard with a socketed BIOS, since you'll probably need a new chip. It's dire if your motherboard has the BIOS chip soldered onto it. In this case, the most economical solution is probably to replace the motherboard.

But this isn't, strictly speaking, hardware damage, the BIOS chip itself still works, it's just had rubbish data written to it. Some really old computers (from the 1980s) may or may not have particular hardware oddities which might have allowed malicious software to damage hardware, for example, by commanding the monitor to try to paint the whole image in one tiny spot. But anything modern enough to run DOS, let alone Windows, won't have these problems.

If you've received a questionable virus warning, or if you just want to know how to spot them, the Computer Virus Myths Web site (<http://www.kumite.com/myths/>) is the place to go. For information on what viruses really do exist, see the Virus Bulletin (<http://www.virusbtn.com/>), a highly respected independent source of virus information.

## Magnetic mayhem

One of the basic tips in every computers-for-idiots book is to keep your floppy disks and other magnetic media away from magnetic fields, lest your data be wiped. Although magnetic fields can eat data, the usual suspects aren't always the problem.

Every ordinary cone-type speaker driver has a large permanent magnet on its back, to give its electromagnetic voice coil something to push against. 'Shielded' speakers neutralise the magnetic field with another opposed magnet glued to the voice coil one, which reduces the driver's efficiency but does the job. An unshielded speaker's magnetic field is clearly apparent if you put it too close to your monitor — the image will distort and change colour. In extreme cases it will stay that way, despite



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the monitor's built-in degaussing circuit, until someone makes magic passes over the device with a degaussing wand.

Putting a floppy disk on top of an unshielded speaker probably won't hurt the data on it at all. This is because it's the change in magnetic field strength, more than the actual peak strength, that erases disks. For this reason, a rapidly oscillating magnetic field is much more dangerous than the static one from a simple permanent magnet.

A old fashioned bell-ringer telephone contains a pulsing electromagnet which moves its bell-clapper and a disk leaned up against it is likely to be a goner. Disks should not be left on top of screens, as the monitor's degauss circuit will zap them. Some printers, especially older dot matrix models, should be avoided as well, as they can contain quite large and poorly magnetically shielded motors.

Essentially, any electronic device with moving parts may be able to zot your floppies, tapes and Zip disks.

## Leaving it on

Some people leave their computers on as long as possible because they believe components come under the most stress when turned on and off, making it less likely to experience failures if the power switch is left alone. There's only a grain of truth to this.

Rapidly switching the power on and off is a bad idea for many electronic devices, including computers and monitors. However, the only problems you're likely to encounter during ordinary use are caused by differential thermal expansion — things get bigger as they warm up and smaller when they cool, and different components in a computer expand and contract by different amounts. The resultant mechanical stress can, theoretically at least, break traces on circuit boards and cause similar havoc.

In the real world, thermal problems with personal computers practically never have anything to do with differential expansion, but instead stem from lousy ventilation. Hot components, hard drives in particular, can barbecue themselves into an early grave.

But scenarios such as these very rarely occur these days. Modern hard drives are very unlikely to suffer motor or solenoid failure on startup. An old drive that's developed *stiction* (where the drive has a hard time spinning up) should be left running all the time, but that problem has never been common and is now almost unknown.

Current 'green' PCs with power-management features provide the convenience of an always-on PC without the high electricity bills; your PC's monitor, hard drives, processor and even the whole computer can be put to sleep and then woken up in just a few seconds.



## Screensavers

The screensaver is a modern art form, but it is no longer a way of saving anybody's screen from anything.

In days of yore, monochrome monitors were susceptible to a phenomenon known as *burn-in* or *phosphor burn*. An image displayed on the monitor for a long period of time could burn in as an incurable ghostly image. Some colour monitors are still susceptible to this, but only if the image has been onscreen for a very long time, which rarely happens in most applications. All you need to do to protect your screen is blank it. The standby features on modern PCs make it easy to save electricity as well as your screen.

If a screensaver has graphical elements that never move then it won't help prevent burn-in anyway. A static screensaver is as bad as a static application screen.

## Don't defrag!

You don't need to defragment your hard drive very often. Modern drive optimisers such as Windows 98's Defrag, which position program data according to how often you use it, can improve performance a little, but there's no reason for even a heavily used

computer to be defragmented every week, or even every month. Yes, it will run faster if it's defragmented occasionally, but the difference will be minimal. If you notice an undue amount of disk flogging, by all means defrag the drive and see if things improve. But defragmenting your hard drive is not a preventative measure.

## Monster swapfiles

Twiddling Windows' virtual memory settings (setting a static swapfile size, for instance) doesn't improve Windows 98's performance much, if at all, although it can help Windows 95. If you choose to do it, don't use the goofy rule-of-thumb that your virtual memory should be a set multiple of your physical memory. You need as much memory as all of the programs you want to run at once will consume, and no more. The more physical memory a given system has, the smaller swapfile it will need.

## Bit rot

If you're running Windows 95 or 98, resign yourself to the fact that, over time, it goes rotten. Sooner or later, any Windows PC that has had programs installed and removed, or its configuration changed numerous times, is going to start misbehaving badly enough that it becomes necessary to zap the Windows directory and reinstall, if not reformat, the hard drive and start afresh. This doesn't mean you have a virus, defective hardware or bad karma. It's just one of those endearing Windows character traits. Similar things happen with Mac OS, and a clean installation can be quicker than trying to pin down the exact cause.

## Data sources

For the good oil on your PC on the Web, check out PC Webopædia at <http://www.pcwebopedia.com/>, the free computing dictionary FOLDOC at <http://foldoc.doc.ic.ac.uk/>, and the PCGuide at <http://www.pcguides.com/ref/>. The first two, between them, can define virtually any computing term. PCGuide is also a well-produced, reliable and up-to-date reference site on PC hardware and software. If you don't have Web access, a monster PC databook, such as Scott Mueller's excellent *Upgrading and Repairing PCs*, is a great way to immunise yourself against computer misconceptions. ■



Save now, browse later — how to store Web pages for easy offline browsing. By Kieran McNamee

## Windows 98

Anyone who uses a dialup connection will be familiar with the frustrations of trying to connect to the Internet on demand. The phone line may be tied up by a chatty teenager or parent, your ISP may be engaged or you may be discouraged by a high hourly rate when you plan to simply read pages and pages of text. Convenience is another consideration. If you use a laptop, for instance, you may not always have access to the Internet, but you may want to use it to read Web pages collected earlier. This month we'll take a look at how to store Web pages for easy offline browsing.

### Internet Explorer capabilities

If you plan to use Internet Explorer 4 (IE4) for offline browsing, you need to be familiar with the concept of subscriptions.

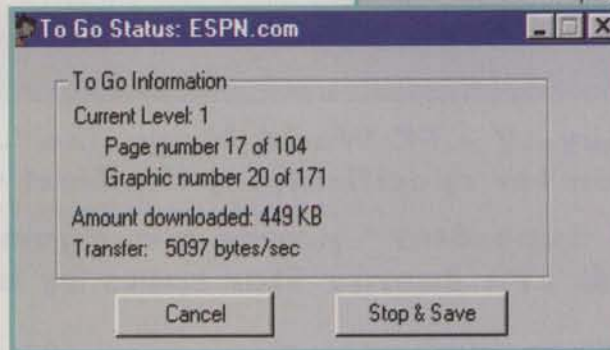
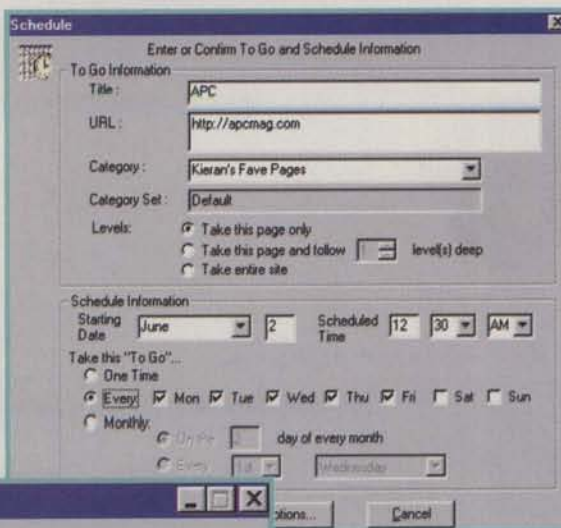
Basically, to store pages for offline browsing in IE4 you need to create a subscription to the chosen Web page and then update the subscription whenever you are online. To add a subscription, you simply select Add Favorite from the Favorites menu and select the option that allows you to download the page for offline viewing.

When you subscribe to a page, you can choose to be notified when the page is updated or allow Internet Explorer to download the entire page automatically. Updating occurs in the background, so it does not inhibit your online browsing.

You can also select Work Offline from the File menu and then open the History. If any pages in your History are still in the cache then you can click on the link and the cached copy of the page will open.

Internet Explorer 5 (IE5) has completely done away with subscriptions. It has improved offline browsing features and there are additional improvements that make this latest version a must to install. If you have not already installed IE5 then I suggest you do. You can find the IE5 setup file in the Workshop section of [apcmag.cd](http://apcmag.cd).

Rather than grappling with subscriptions, IE5 allows you to go to the page you want to store for offline browsing by simply adding it to your Favorites and specifying whether you want it to be available offline. You can customise how the Web page is made available offline by clicking the Customize button. The number of links to follow off the home page can be set and you can create a schedule for automatic updates. If you



The History feature of IE5 is identical to that of IE4. Any pages that are in the cache and available for viewing can be clicked on, while greyed-out links indicate that the page is no longer available. Clicking on an unavailable History link will display a

dialog box giving you the option to connect to the Internet.

A handy way to access your favourite Web page offline is to create a shortcut to the site on your desktop. I like to store daily stories from my local newspaper on my laptop and read them at my leisure throughout the day. A shortcut on the desktop is the easiest way to access these stored pages, and as long as you have synchronised the content for the link, your browser will open and display the page instantly.

### Further assistance

Netscape doesn't offer much in terms of offline browsing, so Internet Explorer is definitely the browser of choice for this task. However, if you are a loyal Netscape user you can make use of third-party

don't schedule updates, you can refresh the copy by pressing the Synchronize button in the Tools menu whenever you are online.

IE5's Synchronize process checks whether the page has changed since the last time you updated the local copy; if it has changed then the appropriate files (text and images) are downloaded to your hard drive. To view the page when you are offline, simply click on the bookmark in the Favorites menu. Bookmarks that are unavailable offline will be greyed out.

If you want offline access to a Web page that doesn't need to be updated frequently, there is an easier way to store it on your hard drive. Simply select the Save As option from the File menu. You can save the entire Web page, complete with graphics, or you can elect to save only the HTML file.



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- PCI Sound card with A3D®
- Sub-Woofers Speakers
- Medium Tower Chassis
- 17" Monitor
- Microsoft Intellimouse
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programs that specialise in storing Web pages for future viewing.

If Internet Explorer's offline browsing features are not powerful enough for you, there are other programs you can use. Three of the best are DataViz's Web Buddy, Intermark's WebSnake and askSam's SurfSaver. Each of these has unique features that can help you determine which one is best for your needs.

According to **Web Buddy's** developer, it is "the must-have utility for anyone using the Web for research", but Web Buddy is a very useful program for everyone. The ability to store Web pages for future viewing is its greatest feature, and it has an easy-to-use toolbar that can automatically load with your Web browser.

The Web Buddy toolbar has two icons that allow you to easily grab the page you are looking at in the active browser window. The Page To Go icon will save the Web page, graphics and all; all you have to do is enter a title for the page. The Site To Go option allows you to save the home page of a site and the desired number of site levels beyond the home page.



So you could choose to have the home page and three further levels of the site downloaded or you could elect to download the whole site. Just make sure the site is not too large; downloading the entire APC Web site is probably not a good idea.

Viewing collected Web pages is simply a matter of typing in the address. All the pages you collect with Web Buddy are listed in Web Buddy Central. You need to open and load the pages from there by double-clicking on the name of the page.

Along with these offline browsing options, Web Buddy provides a few other useful features, such as the ability to convert a Web page for use in a word processor. This may come in handy, but the formatting is not exactly the same as the way the page appears in your Web browser.

**WebSnake** is my favourite tool for storing Web pages. It collects Web pages and Web sites effectively, but it can also do much more. With WebSnake you can duplicate or mirror Web sites, copy email

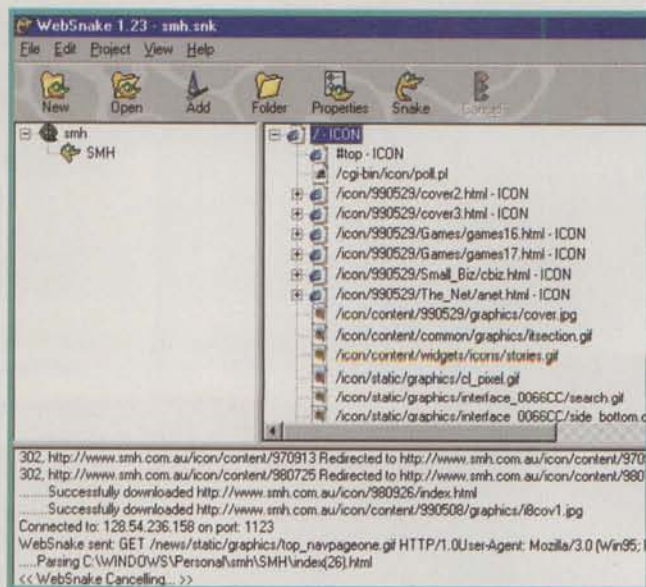
addresses referenced in a page's HTML, build a map of the HTML files used in a Web site, search for specific words on a Web site, and even retrieve specific file types like WAV or AVI multimedia files. These features can become a little complicated, but there are a number of wizards that simplify the process.

WebSnake offers numerous offline browsing options so you can customise the way Web pages are collected. The number of links can be limited by staying within the qualified domain or within the current server, or by following all of the links regardless of the server. A retrieval project can be halted automatically by setting conditions such as a limit on the number of HTML files retrieved or the amount of available space on your hard

drive. You define these settings when you first start a project.

Even though it is not directly related to offline browsing, the WebSnake's Search and Retrieve feature can be very handy if used effectively. You can set up a Search and Retrieve project so that WebSnake searches a Web site for particular file types, such as text files, image files (GIF, JPEG) and audio files (WAV, MP3). You can also search for files using keywords. WebSnake searches for the keywords in the displayed text of the HTML files, as well as the HTML source code.

**SurfSaver** is similar to the other programs, but it integrates into your browser rather than acting as a stand-alone program. Although SurfSaver performs many of the same functions as IES,



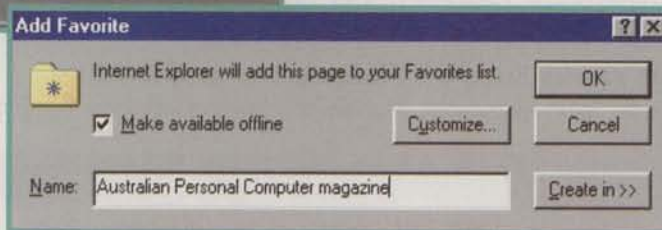
it is a great supplement for those loyal Netscape users.

Netscape users can access SurfSaver by choosing bookmarks and then selecting a SurfSaver command. To save the page that you are viewing in Internet Explorer, you simply right-click anywhere on the page. The SurfSaver commands include a few options (in Internet Explorer the SurfSaver options are near the bottom of the right-click menu): SurfSaver Save, SurfSaver QuickSave and SurfSaver Search.

The Save and QuickSave commands are self-explanatory. The Search option brings up a split-screen window with your search results at the bottom and selected pages displayed at the top. A

couple of search options are accessible by pressing the Options button. For precise searching you can define and use the NEAR command. This allows you to search for pages where words are a specific number of words, lines, sentences or paragraphs apart, which is a brilliant way to find information.

You can install evaluation versions of all these programs from **apcmag.cd**. If you are serious about offline browsing then it would be wise to invest in the full version of one of these programs. Their prices are as follows: Web Buddy, \$93 (distributed by Conex, <http://www.conexus.com.au/>); WebSnake, \$US29.95 (<http://www.imarkmall.com/Websnake.html>); SurfSaver, \$US29.95 (<http://www.surfsaver.com/>). ■





Updating your system shouldn't be daunting. We take a look at what's in the latest OS/2 FixPak and tell you how to use it. **By Christopher Relf**

# OS/2 Warp

Fixpaks, service packs, OS updates; it doesn't matter what you call them, they're a necessary evil in the world of computing. Almost every program ever written requires an update or two after its release, so why should your favourite operating system be any different? IBM releases OS/2 fixpaks periodically and some of the updates they contain can be very helpful. Is there a bug (or maybe it's just a 'feature') that continually fries you? Having problems with a dialog box that won't leave you alone? Can't seem to find out where that memory leak is occurring? The latest fixpak may be all you need.

## Service types

The idea of servicing your operating system is analogous to servicing your car; routine maintenance keeps things running smoothly. Components don't wear out like those in a car, but they may need updating or replacing to overcome design flaws, provide new functions, or to ensure compatibility with newer software. Fortunately, you don't have to take your PC in for a service — you can do it yourself by obtaining the new items on disk, via a LAN or the Web.

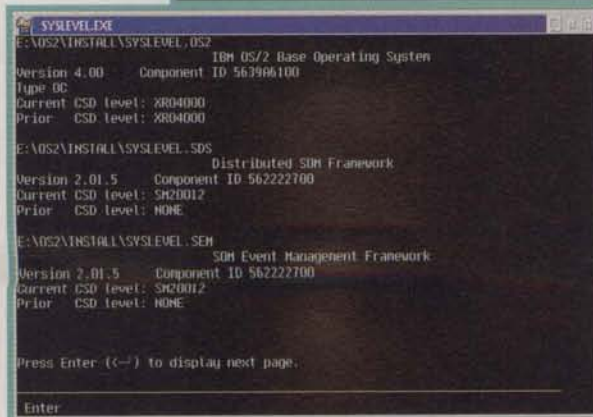
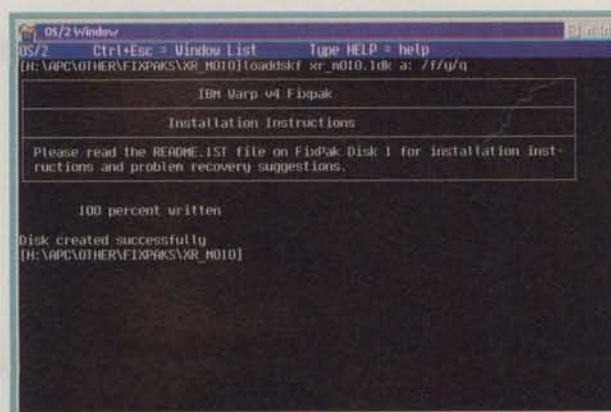
Servicing OS/2 with IBM fixpaks is a multistage task. First, and probably most importantly, you'll want to apply any Base Operating System FixPaks (BOSFs). These are the largest and most complex fixpaks with an average of a few hundred files to be serviced. They are applied using an IBM software package called the Corrective Service Facility (CSF).

The Display Driver FixPak (DDF) contains updates to the video drivers supplied by IBM and is generally only one or two disks. It's a good idea to have the specific drivers for your video card handy in case you need to install them after the fixpak.

The third and final major fixpak is the Printer Driver FixPak (PDF), which contains printer driver updates.

I can already hear some of you think-

ing, 'but my printer or video card is supported by a third-party driver'. That's fine. Generally, the fixpaks not only update specific printer and video drivers, they also update the actual printer and video systems within OS/2. Of course, there



are other fixpaks out there for other subsystems including LAN and TCP/IP paks. These can be downloaded directly from the OS/2 Web site — go to <http://www.ibm.com/> and search for 'fixpak'. This month, we'll only look at the BOSF.

## Can I install one version over another?

Thankfully, all of the BOSFs released for Warp 3 and Warp 4 have been cumulative. This means that all of the information in BOSFs 1 through 9 is very sensibly included in BOSF 10, so there's no need to install BOSFs sequentially to reach a certain corrective level.

## Which one is for me?

Each fixpak is given a unique identifier (for instance, XROM010 is the US English version of FixPak 10 for Warp 4), but they are very rarely used. Most of the time, fixpaks are known by names such as Warp 4 fixpak 10, Warp 4 FP1 or W4FP1. You should generally use the most recent release of a fixpak, because it will include all of the previous fixes. But like any software, you should wait a month or so after a fixpak is released and then scour the OS/2 newsgroups for any bug reports. If you think you can handle them, then go for it. If you're not sure which service level you have reached

for your BOSF, DDF or PDF, try running syslevel in an OS/2 window. This will give you all the information you need.

## The disclaimer

Please read it! Basically, you use fixpaks, whether released by IBM or not, totally at your own risk! Although installing a fixpak will, by default, create a backup you can revert to if all goes to cactus, it's by no means guaranteed. Although I've never heard of a problem with the backup/restore function of the BOSF, it's still something to consider. You may want to do your own system backup before installing the fixpak, just in case something does go wrong. More information is contained in the README.INF file included with the CSF.

## Is it risky?

Well, not really, but you should decide whether or not your PC really needs servicing. I know people who apply every fixpak as soon as it comes out while others wait for a fixpak that fixes a particular problem. Both methods have their merits. If you install every fixpak, you usually end up correcting a problem that you didn't even know you had until it was fixed. On the other hand, if you wait, there's much less chance of screwing up your system. If



you only use OS/2 for a couple of reproducible tasks and you're happy with OS/2 as it is, you shouldn't bother.

## How do I do it?

There are currently two general approaches to installing BOSFs. You can either download the disk image files (the latest BOSF is on **apcmag.cd**) and create disks, or you can take advantage of an automated procedure called a Remote Service Update (RSU) using Internet access and an OS/2 Web browser such as Netscape/2 or WebExplorer.

## Disk image files

The latest disk image files can be found at [ftp://ftp.software.ibm.com/ps/products/os2/fixes/v4warp/english-us/xr\\_m010/](ftp://ftp.software.ibm.com/ps/products/os2/fixes/v4warp/english-us/xr_m010/). The downloaded files will generally have extensions like 1dk or 2dk. The extension numbers refer to the number in the fixpak disk set, but the increments are not decimal integers, so you should make sure you have the full set.

You will need the CSF disk (either the Kicker, or more often, the Fixtool) and the fixpak image disks. The CSF is the program that applies the information in the fixpaks. Once you're sure that you have all of these, there are two methods of installation often referred to as the FSERVICE and SERVICE applications.

- **FSERVICE** This is the older method of applying a fixpak from the command line. You need to create a boot state of OS/2, either by booting OS/2 from a diskette, booting to a command prompt

### Service checklist

**You should apply a service if:**

- IBM support suggests it will fix a specific problem
- It includes a new function you can use
- It includes a new driver that you need
- It provides general system maintenance
- You need to access current OS/2 support
- You often get a TRAP error

**You should leave your system alone if:**

- You can't make a system backup first
- Your hardware hasn't changed
- You can't afford the downtime

## Driver demand

The German arm of Team OS/2 recently completed a worldwide Internet survey asking people what drivers they would like to see for OS/2. The survey closed on May 6 and attracted 36,484 responses.

IBM Germany had previously conducted a survey which asked 17 of its corporate customers which device drivers they believed would be appropriate in OS/2 over the coming year and an half. OS/2 Deutschland e.V.i.g. caught on to the idea and opened the forum to everyone. The result was no less than astonishing — OS/2 is far from dead (or dying) in the home user market and users are apparently looking forward to updates of OS/2 in the future.

Detlef Schäbel, a spokesperson for OS/2 Deutschland e.V.i.g., commented in an email to the IDG News Service that "For IBM USA, the client is the large customer. The needs of small or private customers don't interest them."

An article by Mary Lisbeth D'Amico in Infoworld Electric reported an

unidentified IBM marketing executive as saying, "The decisions on which drivers to include are made from IBM's US laboratory . . . [but w]e got out of the market for end users over two years ago."

D'Amico has also quoted Schäbel as saying that many of the survey's respondents were from some of IBM's larger corporate customers, including Deutsche Bank and Volkswagen.

OS/2 Deutschland has passed the emails onto IBM Germany, which intends to pass them onto IBM in the US, according to Marcus Specht, the head of OS/2 Deutschland. "I was told they [IBM Germany] would personally see to it that they receive them," Specht said. No official comment has been recorded from either IBM Germany or IBM United States at this time.

The survey's impact was summed up on the Team OS/2 Web site: "The driver action proved it once again. There are more OS/2 users than IBM wants to believe".

OS/2 Deutschland can be reached at <http://www.teamdv.de/>.

from the Recovery screen (press Alt-F1 when the OS/2 box appears during the boot process), or by creating a maintenance partition. Although I have a fondness for the command line, most people prefer to use the PM GUI for servicing due to its ease of use.

- **SERVICE** On the CSF disk, you'll find a PM program called SERVICE.EXE. It's an intuitive, easy-to-use fixpak service application utility. When you run SERVICE.EXE, a PM screen appears and a dialog box asks you where the disk images of the fixpak are located (either drive A: or B:, depending on your floppy disk hardware setup).

## Applying the SERVICE

You'll need a few floppy disks to do this — the number of disks should equal the number of fixpak and CSF images. There are a few third-party utilities available, but they are often unreliable or only appropriate for a certain range of fixpaks. First, you'll need to create the CSF disk by typing CS\_140 a: at the OS/2 command prompt.

The CSF image should extract to the floppy in drive A: (please make sure that the floppy you are using is freshly format-

ted or the CSF image extraction may fail due to inadequate disk space). Next, each of the fixpak disk images needs to be created — this will take up to 45 minutes, depending on your system. To do this, type `loadskf xr_m010.?dk a: /f/y/q`, where ? is the identifier of the disk image you want to extract (0 to 9, a to z). If you don't have `loadskf.exe`, you can find it under the `install\` directory on the OS/2 Warp 4 CD-ROM. Don't forget to label each disk as it comes out of the drive! I've been bitten many times due to careless disk swapping.

Now you're ready to apply the service. It couldn't be easier; simply put the CSF disk back into the A: drive and type SERVICE at the command prompt. Follow the prompts and a few hundred files will be replaced or updated.

After restarting, it's always a good idea to check that the update was successful. To do this type `syslevel` in an OS/2 window.

APC always welcomes readers' input. Please email your OS/2 Workshop comments and requests to [Christopher.Relf@tip.csiro.au](mailto:Christopher.Relf@tip.csiro.au).

For a complete archive of APC OS/2 columns, see <http://apcmag.com/os2/>.



An overview of new features — some obvious, some well-buried — in Mac OS 8.6. By Stephen Withers

# Mac OS

Some updates scream 'Hey, I'm new!' while others just quietly go about their business. Mac OS 8.6, released in May, falls into the latter category. If the final digit in the startup splash screen and About This Computer hadn't changed, you could be forgiven for not noticing whether a particular Mac was running 8.5 or 8.6.

But that 60M update does make a difference, it's just most of the new features are hidden beneath the bonnet. The best source of summary information is Tech-note 1163: Mac OS 8.6 (available at <http://developer.apple.com/technotes/tt/tt1163.html>). A lot of the changes relate to stability, so unless particular issues that have caused you trouble are addressed by 8.6, you won't notice the difference. Our own experience with 8.5.1 has been very positive, but if, for example, your PowerBook hasn't been displaying icons correctly in the main drive window when you open it after the drive has spun down, 8.6 should set this right.

Other changes are performance-related. For example, text can be displayed more quickly; long, scrolling menus are drawn more quickly; and desktop pictures no longer draw very slowly on computers with more than 700M of RAM (you should be so lucky).

The Multiprocessing API Library is an interesting inclusion. While it makes provision for pre-emptive multitasking, it also lets developers create applications that perform pre-emptive multiprocessing on systems fitted with multiple PowerPC processors. Apple has not shipped a multiprocessor system since the 9600MP, so this might be a clue that the company intends to release a multiprocessor Mac — presumably a G4 — before the desktop version of Mac OS X appears.

## Sherlock

The Sherlock searching system has proven to be a very popular feature of Mac OS. Version 2.1, which is part of Mac OS 8.6, has some convenient improvements. The Search Internet panel is now resizable (previously a third-party enhancement was needed to obtain this feature) and all search sites can be deselected by clicking a



This desktop picture is Apple's treat for keen scripters.

single button. Over 20 search modules are now included.

The local Find by Content feature has also been enhanced with the ability to (re)index individual files or folders. This can be a big timesaver, especially when the documents you particularly need to access are organised within a small number of folders. Simply select the files and folders to be indexed, and choose Index selection... from the contextual menu.

A new mechanism has been provided to allow the indexing of a wider range of files and to improve the quality of indexing. The Find by Content indexer can be supplemented with Text Extractor plug-ins, which, as the name suggests, extract the text from files whose type isn't TEXT. Mac OS 8.6 comes with HTML and PDF extractors, which means most README files and release notes will be accessible through Sherlock. Extracting the 'content' text from HTML files means, for example, occurrences of the word 'body' will only be indexed when they are not part of a <BODY> tag.

Creating a Text Extractor is a programming job; it's not just a matter of scripting (as it is with Sherlock plug-ins). However, it shouldn't be too difficult for developers to add Text Extractors for their products and we look forward to seeing them. There's obviously some potential

for DataViz to add Text Extractors to MacLinkPlus Translators, as the company has already done the hard work of figuring out how to interpret various word processor, database and spreadsheet file formats.

It isn't widely known that Sherlock's summarize function doesn't only work on text files — if MacLinkPlus is installed, the summarizer will call upon it to translate the contents of the file to text before summarizing the result.

When calling the summarizer from an AppleScript, the best approach seems to be to attempt the summarisation and then test for an error if the file couldn't be translated, rather than only attempting to summarise certain file types. For example:

```
on open file_list
    set the_file to item 1 of file_list
    try
        set the_clipboard to
            (summarize the_file in 3)
    on error number errNum
        if errNum = -3030 then
            display dialog
                "Error - no text in document or no translator
                available." buttons {"Cancel"} default button
                "Cancel"
        else
            if errNum = -
                1302 then
                display dialog "Error - can't summarize a
                folder." buttons {"Cancel"} default button
                "Cancel"
            else
                display dialog ("Error " & (errNum as string))
                buttons {"Cancel"} default button "Cancel"
            end if
        end try
    end open
```

## AppleScript

AppleScript 1.3.7 fixes several problems concerning memory leaks and overall stability. The data types degrees Kelvin and quarts have been added (your scripts can coerce a temperature from Fahrenheit to Kelvin, for example), and the previous inability to coerce miles to another



appropriate data type such as kilometers has been fixed. For example,

```
set howFar to 1 as miles
set howFar to howFar as kilometers
display dialog howFar
```

shows the value 1.609343997554.

One new and useful extension to AppleScript is the URL Access Scripting addition. This lets you download a URL to a file, or upload a file to a URL without opening a browser or an FTP tool. An interesting demonstration of it involves downloading the current image from a Webcam and using it as a desktop picture. This script is available at <http://www.apple.com/applescript/desktop/desktopcam.html>, and can be customised to access other Webcams.

Several other changes have altered the way AppleScript behaves in relation to Folder Actions, so it's worth reading pages 14 and 15 of TN1163 if you write scripts.

There are some interesting and useful new sample scripts in AppleScript CD-ROM Extras. One set manipulates filenames (eg, adding a prefix or suffix), another provides additional folder actions (eg, summarising the text files added to a folder), and a third offers 'Universal' scripts such as opening a folder on the desktop. The fourth set is aimed at AppleScripters, and the individual scripts copy specific subroutines to the Clipboard, where they can then be pasted into the script under development. Examples include writing to or reading from a file, and extracting a filename from a file path.

In the same folder are copies of OSA Menu, which adds a Scripts menu on the right of the menu bar (you'll need this to use many of the sample scripts), and iDo, which runs scripts according to a schedule.

If you didn't buy the 8.6 CD-ROM, you can download the Extras from <http://asu.info.apple.com/swupdates.nsf/artnum/n11402/>.

In either case, it's worth checking out the scripts for the QuickTime 4 Player (<http://www.apple.com/applescript/qtscrip/qtscrip.html>) and those for creating and using sets of Sherlock plug-ins ([http://www.apple.com/applescript/sherlock\\_sets/](http://www.apple.com/applescript/sherlock_sets/)).

Keen AppleScripters might like the AppleScript desktop picture from [http://www.apple.com/applescript/desktop\\_pix/](http://www.apple.com/applescript/desktop_pix/). Although it's a fairly simple image, it looks best on an uncluttered desktop.

## USB

If you've retrofitted an older Power Macintosh with a USB card (see APC, June 1999, page 157), you no longer have to worry about developer releases of the drivers, as the USB (and FireWire) software has now been rolled into Mac OS. Game Sprockets is also included, supporting a variety of game controllers and making it easier for developers to use the Mac's video, audio and networking capabilities. Furthermore, the LaserWriter 8.6.5 driver supports USB PostScript printers.

## Java

Mac OS Runtime for Java 2.1.1 delivers a substantial performance improvement (three to five times faster than MRJ 2.0, according to Apple), but company officials admit it hasn't quite achieved the goal of being at least as fast as the fastest PC implementation, when both are running on the fastest available hardware. More importantly, it implements JDK 1.1.7 with bugfixes from 1.1.8H (roll on 2.0!) and supports the Swing 1.0.3 and 1.1 GUI extensions. Furthermore, the AWT implementation uses the Appearance Manager, so the appearance of AWT windows reflects the current theme.

Note that MRJ 2.1.1 is not part of the Mac OS 8.6 updater, though it is on the 8.6 CD-ROM. In any case, Version 2.1.2, which, according to Apple, "addresses" security and other issues, is downloadable from <http://www.apple.com/java/>.

Things get interesting when you start looking at the way MJR makes Java applications accessible from AppleScript with automatically generated terminology for public class, property and method names.

This isn't for beginners, but if you program in Java, download the MRJ SDK from

<http://developer.apple.com/java/> and study the contents of About MRJ Scripting (found in the MRJ Scripting subfolder). You'll also need the GTQ Scripting Library (obtainable from [http://www.scriptweb.com/osaxen/gtq\\_scripting\\_library.html](http://www.scriptweb.com/osaxen/gtq_scripting_library.html)) and an aete editor for ResEdit. The latter proved surprisingly difficult to track down, but I eventually found one at <http://www.rzs.net/files/aete.sea.hqx>.

## Miscellaneous tips

**Conflict Catcher 8** users should download the 8.0.5 updater from Casady & Greene's Web site (from Conflict Catcher's Web menu, select Update Conflict Catcher). This version includes information about Mac OS 8.6's extensions. If you plan to do a clean installation of 8.6, update Conflict Catcher to 8.0.5 before you start so you can use the Clean-Install System Merge feature (in the Special menu) to move your third-party extensions and other files into the new System Folder.

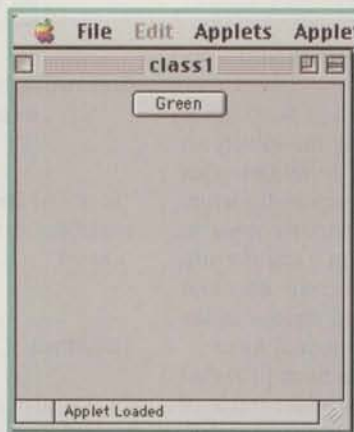
**Help Center** is not directly associated with Mac OS 8.6, but Apple has released some additional help modules covering various aspects of AppleScripting, including a beginner's tutorial and scripting Users & Groups or Open Transport. You can download them from [http://www.apple.com/applescript/help\\_mods.html](http://www.apple.com/applescript/help_mods.html).

**Hard Disk Toolkit** Apple warns that Hard Disk Toolkit 3.0.2 is the earliest version that can install a compatible driver on a Mac OS 8.6 startup volume.

**DVD** One of the handy features of the newer 'generation 3' DVD-ROM drives is that they are capable of reading DVD-RAM disks. This is a convenient and relatively affordable way of moving large quantities of data from one computer to a few others. The Apple CD/DVD Driver supports this, but you'll also need to ensure the Foreign File Access and UDF Volume Access extensions are also active. UDF (Universal Disk Format) is a cross-platform standard used with DVD-ROM and DVD-RAM disks.


**iMac** A firmware update is required before Mac OS 8.6 can be installed on an iMac. The firmware updater is in the CD Extras folder of the 8.6 CD-ROM. If you have downloaded the 8.6 updater, the firmware updater is available at <http://asu.info.apple.com/swupdates.nsf/artnum/n11177/>.

**Mac OS X Server** Information about updating NetBoot Server images to Mac OS 8.6 can be found at <http://til.info.apple.com/techinfo.nsf/artnum/n60363/>. Apple does not recommend the use of Mac OS 8.6 with MacOS.app (the Mac OS environment for Mac OS X Server).■



The Class1 applet from this month's Java tutorial — note that the button hasn't changed colour, presumably due to the Appearance Manager overriding the setting



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Keeping interlopers out of your system.

By Geoffrey Bennett

# Linux

This and next month's articles are about securing your Linux system.

Since security is a very wide-ranging area and many thick books have already been devoted to the topic, we're only going to address the topic of reducing the risk of people gaining unauthorised access to your system, specifically:

- preventing people with physical access to your computer from gaining root privileges or being able to read/modify files they shouldn't be able to;
- preventing people with regular user (shell) privileges from gaining root privileges;
- preventing people who have network access to your computer from gaining any type of user privileges unless they have a valid user account.

The topic of preventing people with regular user privileges from reading files they shouldn't be able to — such as file system permissions — was covered in Linux Workshop, APC June 1999, page 159.

## The root user

First, an introduction to the root user. Under Linux, root is all-powerful. Security restrictions such as file system permissions are bypassed when you are logged in as root, so for this reason, it is important that you only log in as the root user when needed. Needless to say, it is not good for an unauthorised person to have access to your system as the root user, since they would be able to read, modify or completely delete anything they cared to on your system.

Root logins are generally only permitted from the console, and not from modem lines or network connections. The list of terminals that root logins are permitted from is stored in `/etc/securetty`, but you should never need to add anything to it. If you need to do something that requires root privileges when logged in from another terminal, you can use the `su` command, which will prompt you for the root password.

If someone else needs root privileges to run only particular commands, you can set up the `sudo` program, which can restrict their access to root to running particular commands (such as to add a new user or shut down the system).

## Choosing a password

If someone else knows your login password, Linux won't be able to tell the difference between you and them, and they will be able to access anything you can. Aside from not telling anyone your password and not writing it down on a sticky note pasted to your monitor, it is a good idea to choose a password that is difficult to guess.

Using your partner's name, the brand of your car, or any English (or other language) word does not count as "difficult to guess", because there are programs commonly available (such as Crack) which can use a word list containing tens of thousands of words and test whether your password matches any of them. Even appending or prepending a number or reversing the word won't help, as these variations (and others) can be tested as well. One technique for choosing a good (and not-so-hard to remember) password is to think of a phrase (such as 'the cat sat on the mat'), take the first letter of each word ('tcsotm'), and then change it by adding a digit or punctuation mark and capitalising some of the letters.

Some Linux distributions have a password-changing tool that will perform some checks on your password before it accepts the change; taking note of these checks (which can be overridden if you are root) will at least slow down any potential password-crackers. If you'd like to run Crack over your own password file, you can download the software from <ftp://ftp.cert.org/pub/tools/crack/>.

It is also a good idea to change your password occasionally. If you want to enforce this, you can use the `chpasswd` utility to set the maximum time between password changes for a user, or modify the `/etc/login.defs` file to change the default value.

## How Linux stores passwords

Login passwords are generally stored in the `/etc/passwd` file. This file is readable to all local users, but the passwords are encoded so that people cannot casually find out your password. If someone nasty gets hold of this file though, they could run Crack on it to discover any weak passwords.

To prevent regular users from being able to obtain the encoded versions of passwords, a 'shadow password' scheme was developed where the passwords are moved out of `/etc/passwd`, and stored in `/etc/shadow` instead. The permissions on `/etc/shadow` are then set so that only root can read the file (it is not possible to simply make `/etc/passwd` unreadable because it contains information that must be accessible to all users). Setting up shadow passwords can be an install option with your Linux distribution, or enabled later with the `pwconv` command.

The standard Linux password-encoding algorithm (which is inherited from Unix) restricts passwords to eight characters in length, but some Linux distributions can use a newer encoding algorithm (named MD5) which supports much longer passwords. To enable this for Red Hat Linux, edit the `/etc/pam.d/passwd` file and add the word 'md5' to the end of this line:

```
password required /lib/security/pam_pwd.so
use_authtok nullok
```

To enable MD5 passwords with Debian GNU/Linux, add this line to your `/etc/login.defs` file:

```
MD5_CRYPT_ENAB yes
```

The next time you change your password, it will be encoded with the new algorithm (but any passwords stored in the shadow file with the old algorithm will still work).

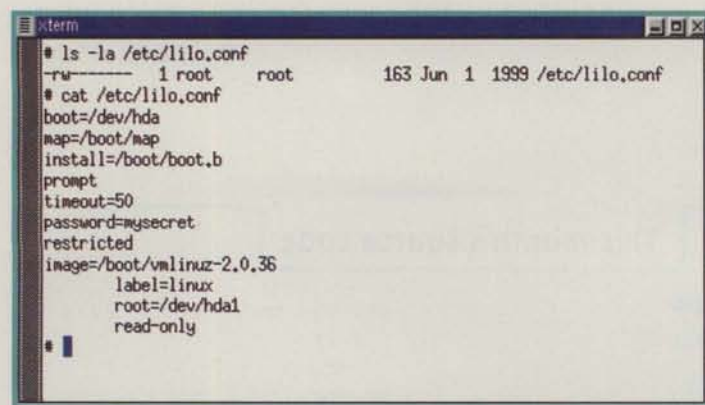
The only disadvantage with using MD5 passwords is that since they are incompatible with standard Unix passwords, any programs that authenticate users (such as `login`, `xlock`, or `imapd`) need to be able to use the new method as well. This shouldn't be a problem if you are only using software that was included with your distribution, but it is something you should be aware of.

## Physical security

Unless your Linux system is kept in a physically protected environment, it is difficult to ensure that anyone with physical access to the computer will not be able to gain access to it as the root user.



For example, in many standard Linux configurations, you can type `linux single` at the LILO boot prompt to boot into single-user mode, where root access is permitted without a password. To prevent this, you



```
# ls -la /etc/lilo.conf
-rw-r--r-- 1 root root 163 Jun 1 1999 /etc/lilo.conf
# cat /etc/lilo.conf
boot=/dev/hda
map=/boot/map
install=/boot/boot.b
prompt
timeout=50
password=mysecret
restricted
image=/boot/vmlinuz-2.0.36
label=linux
root=/dev/hda1
read-only
```

Figure 1

can configure LILO to require the use of a password either every time the system is booted, or only when additional options are specified. To do this, you can use the `PASSWORD` and `RESTRICTED` options in the `/etc/lilo.conf` file as described in LILO's documentation (most likely found in the `/usr/doc/lilo-*` directory on your system). If you place any passwords in `lilo.conf`, don't forget to set the permissions so that only root can read the file.

Figure 1 shows a `lilo.conf` file that requires a password ('mysecret') if any additional options are specified at boot-time.

Even if you have set a LILO password, it is possible for someone to boot from a floppy disk with a self-contained Linux distribution on it, mount the hard disk, and then view or modify whatever files they wish. If this is a concern, practically all PC BIOSes let you change the boot order so it will attempt to boot from the hard disk before trying to boot from a floppy disk. You'll also need to password-protect the BIOS configuration to prevent anyone from changing the boot order back to its original setting.

Protecting the BIOS configuration with a password won't prevent someone from opening the computer and performing the appropriate actions (usually shorting a particular jumper on the motherboard) so that the BIOS 'forgets' its configuration and can again be booted from a floppy disk. This is where it comes back to physically securing your computer; unless it is locked away or you have an armed guard protecting it, someone can reset the BIOS configuration or simply steal the computer to gain access to the data stored on it.

As a side note, there is a tool available for Windows that lets you access your Linux file system from Windows. As Windows doesn't have the same idea about users and file system permissions as Linux,

the permissions on files have no meaning under Windows. If you have Windows installed on the same computer as Linux, you couldn't prevent this tool being used unless you restrict access to Windows with a LILO password or some other method (and in any case, doing this would still

leave you with the same physical access problems mentioned above).

## File system encryption

Encrypting stored data can help prevent the problems associated with physical access to the machine. Due to US export restrictions, you are unlikely to find the necessary programs as a part of your Linux distribution, but a few options are available from outside the US:

- Loop device driver: <ftp://ftp.replay.com/pub/crypto/linux/all>
- Crypted File System (CFS): <ftp://ftp.replay.com/pub/crypto/disk/>
- Transparent Cryptographic File System (TCFS): <http://tcfs.dia.unisa.it/>

If you use an encrypting file system, it is important to be aware of temporary and deleted files that may contain sensitive information. For example, when you edit a file, the changes are often kept in a file in the `/tmp` directory until you save your file and quit the editor. Even though the editor deletes the temporary file when it has finished with it, it may be possible to retrieve the information. To prevent this, be sure to never store sensitive

data on an unencrypted file system, and double-check where your editor stores temporary files.

## Screen-lock utilities

If you trust users with local access enough to not steal your computer, but not enough that you'd want to leave your terminal logged in unattended, a screen-lock utility may be what you need. If you run the X Window System, you probably already have `xlock` installed. Just type `xlock` and a random screensaver will be displayed until you type your password to unlock the screen. Figure 2 shows the 'maze' screensaver in action.

If you log in to Linux in text mode, use `startx` to run X and then `xlock` to lock your X session, be aware that it is possible to switch back to your original text virtual console while `xlock` is running, access your account through there, then switch back to X. To prevent this, you can invoke X with a command-line such as `startx & logout` which will run the `startx` command in the background, and immediately logout from that virtual console. Another way to prevent this scenario is to use `xdm` instead of `startx`, so that you only ever have a graphical login prompt. To enable `xdm` on bootup, change the `initdefault` line in `/etc/inittab` from 3 to 5.

If you use Linux through the text-mode console without X, the corresponding utility to `xlock` is `vlock`. To lock only your current session, type `vlock`, or to lock all virtual console sessions, type `vlock -a`.

Next month we will continue the topic of security by looking at local user and network security.



Figure 2



What you need to know when comparing and copying strings.

By Michael Smith

## Simple C++

This month we're going to look at C strings and how they can be compared, copied and manipulated. But first, some background information.

To produce some interesting examples, you need to be able to read in lines of text. This can be done using `std::cin.getline()` and `std::cin.eof()`. The workings of `cin` are complex and we'll get to them another time.

Listing 1, `cat.cpp`, illustrates the use of `std::cin.getline()` and `std::cin.eof()`. This is a cut-down version of the Unix `cat` command. It reads in lines of text and writes them out again.

`std::cin.eof()` will return `FALSE` until end of file is reached, then it will return `TRUE`. On each iteration of the loop, a line of text is read in using `std::cin.getline()`. This copies a line into the array buffer.

The second parameter, `BUFSIZE`, indicates the size of the array. If the line is too long, only the first `BUFSIZE-1` characters are copied, with a NUL character appended to the end of the array. After reading in the line, it is written out again using `std::cout`.

### Getting sorted

Listing 2 is the source for `sort.cpp`, which demonstrates more string-related functions. The first new thing in this program is the inclusion of the `<cstring>` header. This provides declarations for a number of functions to manipulate C strings, including `strcmp()` and `strcpy()`.

### This month's source code

#### Listing 1: `cat.cpp`

```
#include <iostream>

int main( void )
{
    const int BUFSIZE = 256;
    char buffer[BUFSIZE];

    while (!std::cin.eof()) {
        std::cin.getline( buffer,
            BUFSIZE );
        std::cout << buffer << '\n';
    }
    return 0;
}
```

#### Listing 2: `sort.cpp`

```
#include <iostream>
#include <cstring>

const int LINELEN = 256;
const int MAXLINES = 100;

int ReadData( char
    data[MAXLINES][LINELEN] )
{
    int NumLines = 0;

    while (NumLines<MAXLINES &&
        !std::cin.eof()) {
        std::cin.getline(
            data[NumLines++], LINELEN );
    }
    return NumLines;
}

void SortData( char
    data[MAXLINES][LINELEN], int
    NumLines )
{
    for (int i=1; i<NumLines;
        i++) {
        char tmp[LINELEN];
        int j;
```

```
        strcpy( tmp, data[i] );
        j = i;
        while (j>0 &&
            strcmp(data[j-1],tmp)>0) {
            strcpy( data[j],
                data[j-1] );
            j--;
        }
        strcpy( data[j], tmp );
    }

    void WriteData( char
        data[MAXLINES][LINELEN], int
        NumLines )
    {
        for (int i=0; i<NumLines;
            i++)
            std::cout << data[i] <<
                '\n';
    }

    int main( void )
    {
        char
        data[MAXLINES][LINELEN];
        int NumLines;
        NumLines = ReadData( data
        );
        SortData( data, NumLines );
        WriteData( data, NumLines
        );

        return 0;
    }
}
```

#### Listing 3

```
int strcmp( char *s, char *t )
{
    int i;
    for (i=0; s[i]==t[i]; i++)
        if (s[i]=='\0')
            return 0;
    return s[i]-t[i];
}
```





The ReadData() function is fairly straightforward. It reads in some lines of text using `std::cin.getline()`. You can see each row of the 2D data array is used as a 1D array.

The SortData() routine is an *insertion sort* adapted from Robert Sedgewick's book *Algorithms in C++*. It uses the `strcpy()` function to copy a C string, and the `strcmp()` to compare two strings. 'C string comparisons' (see right) explains a little about how these comparisons work. Insertion sort was chosen for its simplicity rather than its efficiency. We'll tackle efficient sorting another day.

Beyond the efficiency of the sort algorithm, we can make one observation. Each iteration of the sort algorithm will copy the strings many times. That is enough to slow down even an efficient algorithm. If we could sort the data without copying it, that would be much more efficient. We planned to present a better solution here, using dynamic memory, but space has beaten us. Next month, I promise.

For a complete archive of our C++ programming tutorial series, see [apcmag.com/simplec/](http://apcmag.com/simplec/).

## C string comparisons

The C string function `strcmp()` compares two strings. A call to `strcmp( str1, str2 );` returns a negative number if `str1` is less than `str2`, a positive number if `str1` is greater than `str2` and zero if they are equal. The definition of equal strings is obvious: they are identical. The definition of 'greater than' is less evident. The `strcmp()` function compares the ASCII values of the characters which make up the string, including the trailing NUL character. When the first unequal character is found, the string comparison is made on that character. Because the NUL (0) is less than any other character, that will always compare as 'less than'.

Listing 3 provides a simple implementation of `strcmp()`, taken from Brian Kernighan and Dennis Ritchie's *The C Programming Language*. Running it produces some interesting results:

```
"AAA" < "BBB"
"aaa" > "BBB"
"AAA" > "AA"
"2" > "1"
"9" > "10"
```

Alpha comparisons generally work as expected, but mixing cases can give some surprises. Comparing numbers only produces the expected results if you are sure that they have the same number of digits.

A full list of the 'printable' ASCII codes can be produced by the `ascii.cpp` program which, along with all the other source code to go with this column, is on this month's **apcmag.cd**.

apcmag.cd

HAVE YOU  
GOT TIRED  
EYES, BLURRED

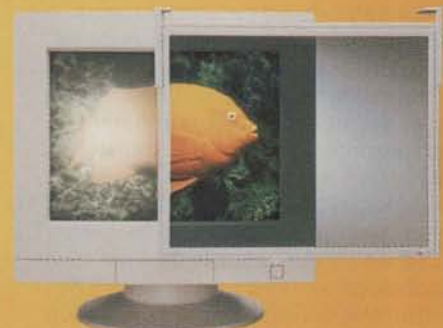
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# Java

Over the past few months in this column you've learned about Java classes, variables, syntax and loops and all sorts of other things that are necessary to write good Java programs.

This month we will look at something more visual: an applet that can be loaded into a Web browser. After all, to many people Java is all about doing fancy things to a Web page. Java is, of course, a serious programming language — and a fully featured one at that.

## Application or applet?

A program written in Java can either be an application — with a main function in one of its classes and invoked from the command line (see examples in *APC* July, page 159) — or an applet. Generally, the term 'applet' refers to a small application with a very specific purpose, such as one of the control panels in Windows, for example. In Java, however, it is possible to write what would normally be regarded as a full-blown application. You can write client/server programs with TCP/IP sockets in a Java applet if you wish. In Java there are only minor differences between an application and an applet, but they are quite specific.

The first difference is the starting point from a programmer's perspective. An application has a main function in a class, as we've seen. If the program contains any graphical displays — rather than just writing out to the screen via `System.out.println` — then the program must manually create a window.

An applet, however, derives from a base class called, logically enough, `Applet`. This base class draws a window on the screen and pre-initialises many default settings for the environment in which the applet will run. The `Applet` class also provides support for arbitrary parameters passed into the class from an outside process.

The second difference is that the Java virtual machine (JVM) used by every Java-enabled Web browser will only run Java classes that derive from the `Applet` class. Hence, to run Java programs in a Web browser, they must be applets.

The third difference is that the JVM inside a Web browser does not permit the

Java applet to easily have any knowledge of your own local hard disk or computer or network. This means an applet that runs within a Web browser cannot write files to disk or gain any knowledge about you or your computer. So, applications can read and write local files, but typical Web-based applets can't.

## Creating an applet

Let's look at an applet. First, we need some Java code.

```
import java.awt.*;import
java.awt.event.*;import java.applet.*;public
class class1
    extends Applet
    implements ActionListener
{
    private Button btnColour;
    private String[] strColours =
    { "White", "Yellow", "Green", "Pink" };
    private Color[] clColours =
    { Color.white, Color.yellow,
      Color.green, Color.pink };
    private int index;

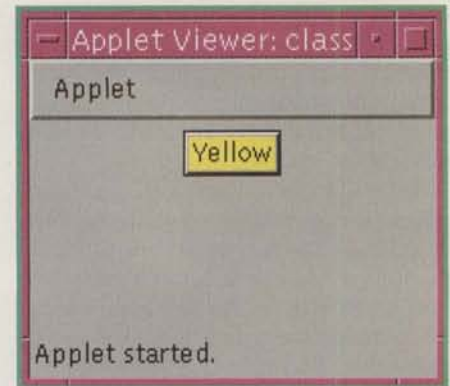
    public void init ()
    {
        setBackground (Color.lightGray);
        index = 0;
        btnColour = new Button (strColours
                                [index]);
        btnColour.setBackground (clColours
                                [index]);
        btnColour.addActionListener (this);
        add (btnColour);
    }

    public void actionPerformed (ActionEvent
                                event)
    {
        if (++index >= strColours.length)
            index = 0;
        btnColour.setLabel (strColours [index]);
        btnColour.setBackground (clColours
                                [index]);
    }
}
```

This is an applet. We create a class, as usual, but extend it from the provided `Applet` class. More precisely, the base class is `java.applet.Applet`, hence the `import java.applet.*`; line at the beginning of the

Creating a Web-based applet.

By David Williams



file. There is no C/C++ `#include` statement or similar code used in this program. Rather, the `import` statement tells Java that we want to be able to refer to any of the classes in the `java.applet` package hierarchy just by their class name, without using the prefix `java.applet` each time. So, we can now refer to the `java.applet.Applet` class as just the `Applet` class.

## Running an applet

How do you actually run an applet given it does not have a main routine like an application? Well, you need an HTML file that calls the applet, like so.

```
<HTML><HEAD><TITLE>Applet
test</TITLE></HEAD><BODY><APPLET
CODE="class1.class" WIDTH="200"
HEIGHT="200"></APPLET></BODY>
</HTML>
```

This is a standard and straightforward HTML page. We have used an `<APPLET>` tag to identify the class to execute, as well as the width and height that it should have on the page.

This HTML file can then be opened with the `AppletViewer` that comes with Sun's Java Development Kit (and most other Java IDEs) or within a Java-enabled Web browser. The above program was tested using Internet Explorer 5 on a PC and Netscape 4.5 on Unix, and it worked fine in both cases. The buttons don't change colour under Mac Runtime for Java (MRJ) 2.1.2 on a Macintosh; this is probably the result of MRJ's integration with the Appearance Manager forcing buttons to match the 'platinum' colour scheme. It doesn't work at all with



Netscape 4.6, so use the Apple Applet Runner or IE instead.

When you open the HTML file in a browser or viewer, you will see a grey area of 200 by 200 pixels. There will be a white button. Click on the button and both its colour and caption change. Click again and again. This is what our applet does — simple and perhaps fun.

## Variables and methods

How does this work? In the Java code we declare a few variables: a button, an array of colour names, an array of colour constants (predefined by Java) and also an index into these two arrays. Let's take them one at a time.

**private Button btnColour;** Just as integers and strings exist in Java, so do such things as command buttons. Button is actually a class, not a simple data type, and is really `java.awt.Button`. Because we imported `java.awt.*` we can simply refer to the class as `Button`. As `btnColour` is an instance of a class, and not a simple variable, we will need to use the new statement later to actually declare memory for the instance.

```
private String[] strColours =
    { "White", "Yellow", "Green", "Pink" };
private Color[] clColours = { Color.white,
    Color.yellow,
    Color.green, Color.pink };
```

Here are two arrays; one of strings, and the other of predefined Java constants from the `java.awt.Color` class. By declaring a variable as an array you effectively permit a range of values to be referred to by the very same variable name, but just with an index used to indicate precisely the element in your collection you want to use. The square brackets indicate to Java that we are declaring an array.

**private int index;** This is a simple integer variable, used to indicate our current index into the two arrays.

As well as variables, you provide two methods. The `actionPerformed` method is called whenever the button is clicked and simply increments our index (or wraps it back to 0 if we exceed the length of our arrays) and changes the colour and label of the button.

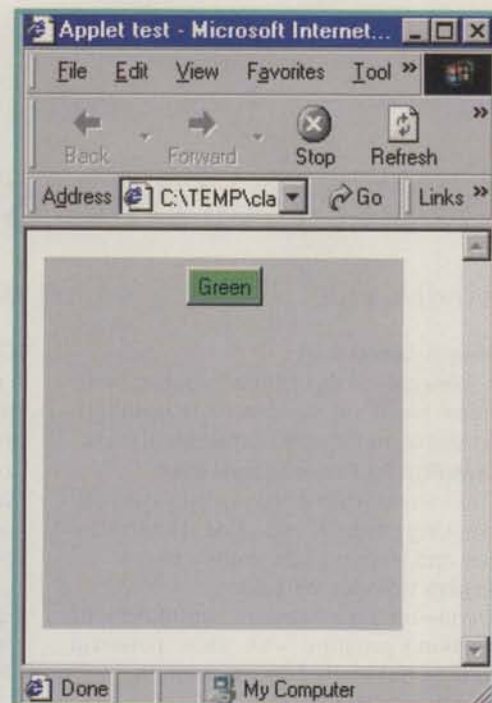
```
if (++index >= strColours.length)
    index = 0;
btnColour.setLabel (strColours [index]);
btnColour.setBackground (clColours
[index]);
```

There is also an `init` method. This is important, as it is the starting point of an applet. Once the HTML file calls the applet, the Web browser's JVM begins running our class at this point.

```
public void init ()
{
    ...
}
```

In the `init` method you simply set the background colour of the applet to light grey, set the index to 0, and create the button and set its initial properties. Use the `addActionListener` method to advise that you want to react if the button is clicked — which is how the `actionPerformed` method is called — and finally add puts the button onto our applet's display area so it can be seen.

```
setBackground (Color.lightGray);
index = 0;
btnColour = new Button (strColours
[index]);
btnColour.setBackground (clColours
s[index]);
```



```
btnColour.addActionListener (this);
add (btnColour);
```

And that's it!

This applet can be included in your Web pages by uploading the `class1.class` file to your Web server directory. Be sure to transfer it as a binary file, rather than a simple text file.

The file that calls the applet is just an HTML page like any other. You can add text and HTML code before and after the `<APPLET>` tag. You can add the `<APPLET>` tag to as many HTML pages as you like.

Over the coming months we will look more at applets and how they work, as well as the graphical objects available in the AWT (Abstract Window Toolkit) packages. ■

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These shareware files can be found on [apcmag.cd](http://apcmag.cd). Simply browse in the Workshop section to find the files and related reviews.

# Shareware summary

## Windows 98

### Xteq X-Setup 4.01

A freeware configuration program with many tweaking options. It is powerful, extensible and ideal for experienced users.

### TweakJr 99 Professional 2.50

This straightforward configuration/tweaking program has good documentation and is strong on security options.

### Registry Styler 99 1.14

A wide-ranging freeware configuration/tweaking program with some powerful options, but limited documentation.

### WinBoost 98 1.3

A user-friendly tweaking program which has some unusual and useful options, including an undo feature.

### WinConfig 3.0

A powerful set of tools to configure Windows. WinConfig goes well beyond the usual functions of tweaking applications.

## OS/2

### Galactic Civilizations

Sometime in the 21st century humankind made a fantastic discovery: a propulsion system that can warp (no pun intended!) space. You're the boss of a new colony — good luck!

### Entrepreneur

The catchphrase 'World domination through corporate warfare!' certainly holds true in Entrepreneur. People who stay up late playing Galactic Civilizations will absolutely love this one, although some may find it a little too realistic.

### Links OS/2

The most advanced golfing game we've played under OS/2. See if you can match other players' performances which are recorded in downloadable 'signature' files. Great graphics too.

### Bill's Unbelievably Ghastly Spaceships (BUGS)

With excellent multiplayer support, BUGS is pure escapism. Classic save-the-Earth arcade action.

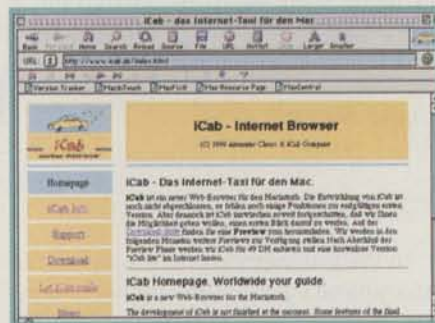
### Trials of Battle

Compete against some pretty mean opponents in hover-tank combat in Trials of Battle. Extended support for multiplayer gaming.

## Mac OS

### iCab Pre 1.5

A promising new Web browser, iCab has a strong resemblance to Internet Explorer, but also has some unique features and amazingly small requirements for RAM and disk space. Some of its features are particularly useful for Web page authors. Free during the prerelease period.



### Palm Desktop 2.1

Arguably the best personal information manager (PIM) for the Mac, Palm Desktop started life as Claris Organizer 2. Distributed as part of 3Com's Mac package for the Palm family of organisers, it is free for use on desktop Macs.

### MacTuner 2.0.5

MacTuner acts as a tuner for the RealAudio audio and video player, providing easy access to the hundreds of Netcasts around the world. You can even search for program sources based on type, location and other criteria. Requires RealPlayer 5.0 or equivalent.

### PlayItCool 3.1.7

If it's a QuickTime file of any variety, PlayItCool can play it more effectively than most alternatives. It incorporates basic editing functions, jog/shuttle controls and real time counters, as well as numerous playback and output options. PlayItCool is the QuickTime tool for everyone.

### File Buddy 5.1

An old favourite but one whose continuing value has to be questioned. File Buddy can perform almost any imaginable operation on files and folders. Its clean-up functions can be useful but should be applied with care.

## DropImage 1.5

A drag-and-drop image viewer that gives file type and creator as well as image dimensions. It can open and save many different formats, depending on the QuickTime version installed. HTML source descriptions can be copied to the clipboard.

### Y2K Software Audit 1.2.8

Y2K Software Audit inspects your application files and compares them with a database of publishers' information on the Y2K compliance of popular applications and utilities. Informative reports include comprehensive Y2K position statements from major publishers.

## Linux

### SSH

This tool allows easy crypto-secure file transfers and remote logins, which are a great help if you need to keep passwords away from prying eyes. There are also client implementations for Windows.

### Octave

Octave is used to manipulate numerical data and mathematical equations. It is largely compatible with Matlab.

### GNUplot

A package for plotting curves and graphs in 2D and 3D. GNUplot supports output to display and to PostScript.



### Pizza Delivery System

Point-of-sale software for pizza bars and similar establishments. It provides a full GUI interface using the GTK toolkit.

### LinPopUp

LinPopUp provides a Linux client for the popular WinPopUp messaging. It is based on Samba file server software.■

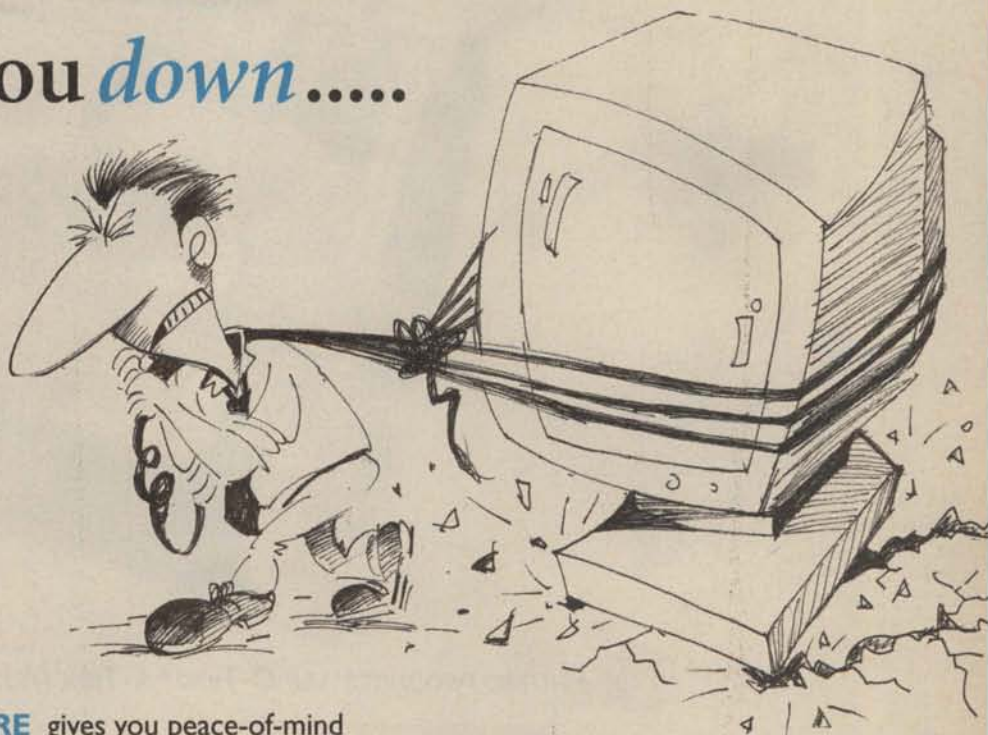


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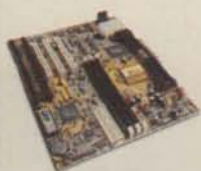
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60

60

9

7

16

45

9

6

6

8

8

8

12

12

6

12

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3-BKL

4-BKL

5-BKL

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CANON, EPSON, HP Fluorescent & Photo Realistic Kits!

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## No. of Refills

3x30

3x12

3x8

3x30

3x12

3x3

3x4

3x12

3x12

3x6

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25-CLR

10-CLR

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14-CLR

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- 4Mb 3D AGP Graphic Card
- 3D Audio & Speakers
- 40x EIDE CD-ROM Drive
- 104-Key Keyboard & Mouse
- Microsoft™ Windows™ 98
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- Y2K Compliant\*\*

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#### Upgrade Options:

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- 64Mb SDRAM ... \$49

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### Business P-400B

Intel® Pentium®II Processor 400MHz

- New Micro Tower ATX Case
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- 6.4 GB Ultra ATA Hard Drive
- 3.5" 1.44MB Floppy Drive
- 15" Philips Digital Monitor
- 8Mb 3D AGP Graphic Card
- 3D Audio & Speakers
- 40x EIDE CD-ROM Drive
- 104-Key Keyboard & Mouse
- Microsoft™ Windows™ 98
- 56K V.90 Data/Fax Modem
- SmartSuite Millennium-Year 2000 ready
- Lotus 1-2-3(spreadsheet), WordPro, Approach
- Freelance Graphics, Organizer, Screeam
- Y2K Compliant\*\*

**\$1599** \$15/w\* Flexirent: 36 mths.

#### Upgrade Options:

- MMI 3-Year On Site Warranty\* ... \$99
- 17" Digital Monitor (0.27dpi) ... \$169

## Digital Star

### PowerNote 6133-400T

Intel® Celeron® Processor 400MHz

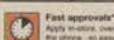
- 12.1" SVGA Active TFT LCD 800 x 600
- 128KB L2 cache
- 32MB SDRAM Expandable to 160MB
- 128-bit 4Mb graphics accelerator
- 4.3GB Ultra DMA Hard Disk
- 24X (max.) CD-ROM drive
- Built-in 1.44 MB Floppy Drive
- 16-bit stereo audio system
- One type III or Two type II PCMCIA
- Built-in microphone and stereo speakers
- Microsoft® Windows® 98
- 1 Year Limited Warranty

**\$2699** \$26/w\* Flexirent: 36 mths.

#### Upgrade Options:

- MMI 3-Year Extended Warranty\* \$189
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- 4Mb 3D AGP Graphic Card
- 3D Audio & Speakers
- 40x EIDE CD-ROM Drive
- 104-Key Keyboard & Mouse
- Microsoft™ Windows™ 98
- 56K V.90 Data/Fax Modem
- SmartSuite Millennium-Year 2000 ready Lotus 1-2-3(spreadsheet), WordPro, Approach Freelance Graphics, Organizer, Screencam
- Y2K Compliant\*\*

**\$1349 \$14/w\*** Flexirent: 36 mths.

#### Upgrade Options:

- MMI 3-Year On Site Warranty\* ... \$89
- Canon BJC-265 Printer ... \$149

### Value V-433C

Intel® Celeron® Processor 433 MHz

- New Micro Tower ATX Case
- 64MB SDRAM
- 6.4GB Ultra ATA Hard Disk
- 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor(0.27dpi, 16"v.i.s.)
- 8Mb 3D AGP Graphic Card
- 40X CD-ROM Drive
- 3D Audio & Speakers
- 104-Key Keyboard & Mouse
- Microsoft™ Windows™ 98
- 56K V.90 Data/Fax Modem
- SmartSuite Millennium-Year 2000 ready Lotus 1-2-3(spreadsheet), WordPro, Approach Freelance Graphics, Organizer, Screencam
- Y2K Compliant\*\*

**\$1599 \$15/w\*** Flexirent: 36 mths.

#### Upgrade Options:

- MMI 3-Year On Site Warranty\* ... \$99
- MS Office 2000 CV ... \$399

### 3D Gaming V-466C

Intel® Celeron® Processor 466 MHz

- New Micro Tower ATX Case
- 64MB SDRAM
- 6.4GB Ultra ATA Hard Disk
- 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor(0.27dpi, 16"v.i.s.)
- 16Mb Voodoo Banshee™3Dfx Graphics
- 40X CD-ROM Drive
- 3D Audio & 500W Subwoofer Speakers
- 104-Key Keyboard & Mouse
- Microsoft™ Windows™ 98
- 56K V.90 Data/Fax Modem
- Free Microsoft SideWinder GamePad
- Y2K Compliant\*\*

**\$1799 \$17w\*** Flexirent: 36 mths.

#### Upgrade Options:

- MMI 3-Year On Site Warranty\* ... \$120
- Logitech Formula Steering Wheel \$168

## PowerPro Series - PROFESSIONAL SYSTEMS

### Performance P3-450B

Intel® Pentium®III Processor 450MHz

- Genuine Intel® SR440BX Mainboard
- New Micro Tower ATX Case
- 64MB SDRAM 100 MHz
- 8.4 GB Ultra ATA Hard Disk
- 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor(0.27dpi, 16"v.i.s.)
- 16Mb Vidia TNT 128-bit graphics
- Creative™Sound Blaster™ PCI 64
- 40 x EIDE CD-ROM Drive
- 104-Key Keyboard & Logitech Mouse
- 56K V.90 Data/Fax Modem
- Microsoft™ Windows™ 98
- SmartSuite Millennium-Year 2000 ready Lotus 1-2-3(spreadsheet), WordPro, Approach Freelance Graphics, Organizer, Screencam
- Y2K Compliant\*\*

**\$1999 \$19/w\*** Flexirent: 36 mths.

#### Upgrade Options:

- MMI 3-Year On Site Warranty\* ... \$120
- 128Mb SDRAM ... \$99

### Power P3-500B

Intel® Pentium®III Processor 500MHz

- Genuine Intel® SR440BX Mainboard
- ATX Mini-Tower Case
- 128MB SDRAM 100 MHz
- 10.2 GB Ultra ATA Hard Disk
- 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor(0.27dpi, 16"v.i.s.)
- 16Mb Vidia TNT 128-bit graphics
- Creative™Sound Blaster™ PCI 64
- 40 x EIDE CD-ROM Drive
- 104-Key Keyboard & Logitech Mouse
- 56K V.90 Data/Fax Modem
- Microsoft™ Windows™ 98
- SmartSuite Millennium-Year 2000 ready Lotus 1-2-3(spreadsheet), WordPro, Approach Freelance Graphics, Organizer, Screencam
- Y2K Compliant\*\*

**\$2599 \$25/w\*** Flexirent: 36 mths.

#### Upgrade Options:

- MMI 3-Year On Site Warranty\* ... \$135
- EPSON Stylus Colour 740 ... \$499

### Extreme P3-550B

Intel® Pentium®III Processor 550MHz

- Gigabyte GA-BX2000 Mainboard
- Intel 440BX AGPset, DualBIOS
- ATX Mini-Tower Case
- 128MB SDRAM 100 MHz
- 13GB Ultra ATA Hard Disk & 1.44Mb Floppy
- 17" Philips Digital Monitor
- 32MB nVidia™RIVA TNT2™ Graphics
- Creative™ Sound Blaster™Live! Value
- 500W Subwoofer Speakers
- 6X DVD-ROM Drive
- Internet Keyboard & Logitech Mouse
- 56K V.90 Data/Fax Modem
- Microsoft™ Windows™ 98
- SmartSuite Millennium-Year 2000 ready Lotus 1-2-3(spreadsheet), WordPro, Approach Freelance Graphics, Organizer, Screencam
- Y2K Compliant\*\*

**\$3799 \$35w\*** Flexirent: 36 mths.

#### Upgrade Options:

- MMI 3-Year On Site Warranty\* ... \$150
- 19" Digital Monitor(0.25dpi) ... \$399

## PowerNote - NOTEBOOKS FOR POWER USER

### PowerNote 6133-433T

Intel® Celeron® Processor 433MHz

- 12.1" SVGA Active TFT LCD 800 x 600
- 128KB L2 cache
- 64MB SDRAM Expandable to 160MB
- 128-bit 4Mb graphics accelerator
- 4.3GB Ultra DMA Hard Disk
- 24X (max.) CD-ROM drive
- Built-in 1.44 MB Floppy Drive
- 16-bit stereo audio system
- One type III or Two type II PCMCIA
- Built-in microphone and stereo speakers
- Microsoft® Windows® 98
- 1 Year Limited Warranty

**\$2899 \$27/w\*** Flexirent: 36 mths.

#### Upgrade Options:

- Carry Bag ... \$48
- 56K V.90 PCMCIA Fax/Modem ... \$168

### PowerNote 6033-333T

Intel® Pentium®II Processor 333MHz

- 13.3" XGA Active TFT LCD 1024 x 768
- 512KB L2 cache
- 64MB RAM Expandable to 160MB
- 128-bit 2Mb graphics accelerator
- 4.3GB Ultra DMA Hard Disk
- 24X (max.) CD-ROM drive
- Built-in 1.44 MB Floppy Drive
- 16-bit stereo audio system
- One type III or Two type II PCMCIA
- Built-in microphone and stereo speakers
- Microsoft® Windows® 98
- 1 Year Limited Warranty

**\$3299 \$31/w\*** Flexirent: 36 mths.

#### Upgrade Options:

- PCMCIA 10Base Ethernet PC Card \$99
- PCMCIA ComboCard 56K+10BaseT\$280

### PowerNote 6033-366T

Intel® Pentium®II Processor 366MHz

- 13.3" XGA Active TFT LCD 1024 x 768
- 512KB L2 cache
- 96MB RAM Expandable to 160MB
- 128-bit 2Mb graphics accelerator
- 6.4GB Ultra DMA Hard Disk
- 24X (max.) CD-ROM drive
- Built-in 1.44 MB Floppy Drive
- 16-bit stereo audio system
- One type III or Two type II PCMCIA
- Built-in microphone and stereo speakers
- Microsoft® Windows® 98
- 1 Year Limited Warranty

**\$3799 \$35w\*** Flexirent: 36 mths.

#### Upgrade Options:

- Canon BJC80 Portable Colour Printer \$345
- Xircom Realport Global Access GSM \$329

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CPU	- Intel Pentium II Celeron 128K Cache Memory
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MEMORY	- Premium Grade 64Mb SDRAM PC100
HARD DRIVE	- 4.3Gig ULTRA ATA EIDE Hard Disk Drive
FLOPPY	- 1.44M, 3.5" Floppy Disk Drive
VIDEO CARD	- 64bit 3D AGP Card with 8MB on board
MONITOR	- 15" ACER 54e (3 Year On-site Warranty)
CASING	- ATX Midi Tower Casing 250W Power Supply
KEYBOARD	- 104 Windows Keyboard PS/2
MOUSE	- Serial Mouse
CD-ROM	- 40X EIDE CD ROM Drive
SOUND CARD	- 3D PCI Sound Pro on board
SPEAKERS	- 80W PMPO Stereo Speakers
NETWORK	- 10/100Mbps Fast Ethernet LAN on board
MODEM	- 56K Fax/Modem on board, supports V.90
SOFTWARE	- Windows 98 in CD fully Installed & Configured
ANTIVIRUS	- Trend Micro's ChipAwayVirus and PC-cillin 98

**PRICE: - \$ 1250 - PII-366A**



**\$ 1300 - PII-400A**  
**\$ 1350 - PII-433A**  
**\$ 1410 - PII-466A**

## Forté Pro Series

CPU	- Intel Pentium II & III Processors
M/BOARD	- Gigabyte GA686BXC Intel BX Chipset
MEMORY	- Premium Grade 64Mb SDRAM PC100
HARD DRIVE	- 8.4Gig ULTRA ATA EIDE Hard Disk Drive
FLOPPY	- 1.44M, 3.5" Floppy Disk Drive
VIDEO CARD	- 8M i740 AGP Video Accelerator Card
MONITOR	- 15" ACER 54e (3 Year On-site Warranty)
CASING	- ATX Midi Tower Casing 250W Power Supply
KEYBOARD	- 104 Windows Keyboard PS/2
MOUSE	- Logitech PS/2 Mouse
CD-ROM	- 40X EIDE CD ROM Drive
SOUND CARD	- Genuine Creative PCI 32 Sound Card
SPEAKERS	- 480W PMPO Stereo Speakers
MODEM	- 56K Fax/Modem Internal, supports V.90
SOFTWARE	- Windows 98 in CD fully Installed & Configured

**PRICE: - \$ 1630 - PII-400**



**\$ 1800 - PIII-450**  
**\$ 2200 - PIII-500**  
**\$ 2730 - PIII-550**

## Forté Luxury Series

CPU	- Intel Pentium II & III Processors
M/BOARD	- Gigabyte GA686BXC Intel BX Chipset
MEMORY	- Premium Grade 128Mb SDRAM PC100
HARD DRIVE	- 13.0Gig ULTRA ATA EIDE Hard Disk Drive
FLOPPY	- 1.44M, 3.5" Floppy Disk Drive
VIDEO CARD	- 16M Diamond Viper V770 AGP Video Card
MONITOR	- 17" ACER 7277C (3 Year On-site Warranty)
CASING	- ATX Midi Tower Casing 250W Power Supply
KEYBOARD	- Honeywell Euroboard Windows Keyboard
MOUSE	- Logitech Wheel Mouse
CD-ROM	- Pioneer 6X DVD 32XR Drive (oem)
SOUND CARD	- Genuine Creative Vibra 128 Sound Card
SPEAKERS	- 600W PMPO Sub-Woofer Luxury Stereo
MODEM	- 56K Fax/Modem Internal, supports V.90
SOFTWARE	- Windows 98 in CD fully Installed & Configured

**PRICE: - \$ 2450 - PII-400**



**\$ 2650 - PIII-450**  
**\$ 3080 - PIII-500**  
**\$ 3550 - PIII-550**

## Forté Server Series

CPU	- Intel Pentium II & III Processors
M/BOARD	- Gigabyte GA686BXC Intel BX Chipset
MEMORY	- Premium Grade 128Mb SDRAM PC100
HARD DRIVE	- 9.1SCSI Seagate Ultra Wide, 7200 rpm
FLOPPY	- 1.44M, 3.5" Floppy Disk Drive
VIDEO CARD	- 4Mb Trident AGP
MONITOR	- 14" LG Monitor (3 Year On-site Warranty)
CASING	- ATX Full Tower Casing 250W Power Supply
KEYBOARD	- 104 Windows Keyboard PS/2
MOUSE	- Logitech PS/2 Mouse
CD-ROM	- 40X EIDE CD ROM Drive
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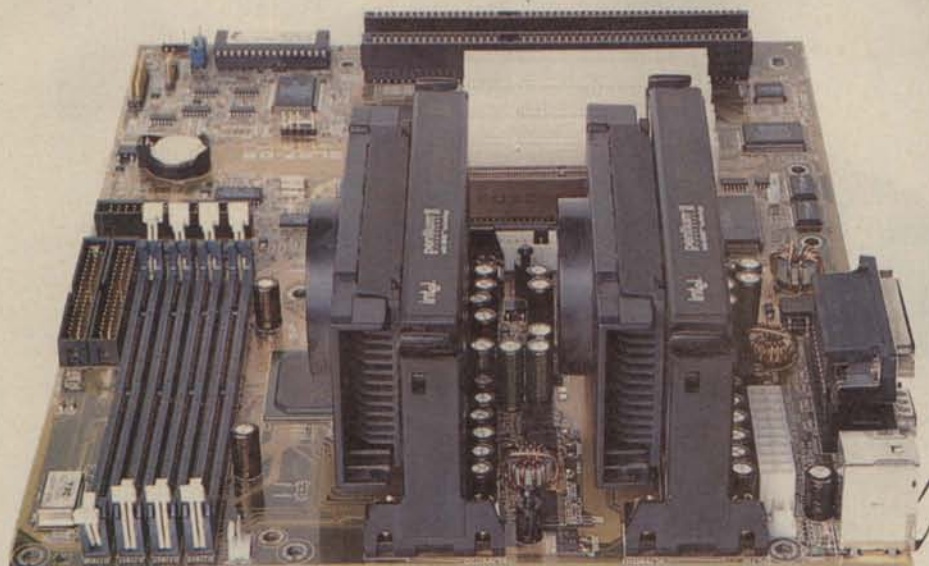
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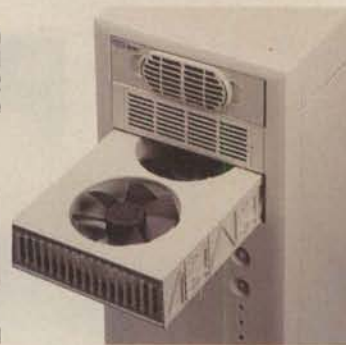
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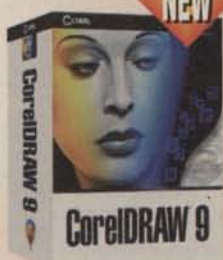
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Ricoh MP7040a 20R4W4RW IDE596	
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Exabyte 4-8G TR-4 IDE	553
Verba TR-3 2.3G 4.4G Tape	60
Verba TR-4 4G Tape	80

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32M Matrox Millen G400 dual h.	286
16M Matrox Video Capture	521
Matrix Rainbow Studio Melle	572
16M Diamond 3D V550 AGP	216
16M Diamo 3D V770 TNT2 AGP	256
32M Diamo 3D V770 TNT2 AGP	366
16M DiamondVoodooBansheeAGP222	
GA630 Voodoo Banshee AGP	200
16M Viewtop VoodooBanshee AGP190	
16M DiamondVoodooBanshee PCI 326	
512K EDO RAM 35ms	6

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Gigabyte GA-6LA7 LX SC370 AT 147	
Gigabyte GA-586AX ATX	140
Gigabyte GA-5AA512 AT	140
Gigabyte GA-6BA 440BX AT	203
Gigabyte GA-6BXC ATX	185
Gigabyte GA-6BXS	461
Gigabyte GA-6BXDS	580

## CPU

Intel Celeron 333A/366A	130/148
Intel Celeron 400A/433A	198/235
IBM M2-300/333MX	80/100
Pentium II 400	358
Pentium III 450/500	518/908
Pentium III 550	1440
AMD K6 II 3D 400/450MMX	185/237

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Logitech Wingman Light	48
Logitech Wingman Extreme	95
Microsoft Sidewinder Precision	126
Microsoft Force Feedback	303
Artec 3 Buttons Mouse Serial	12
Logitech 3 Buttons PS2 Mouse	25
Win95 Mitsubishi Keyboard	25
Win98 Keyboard PS2	23
Honeywell Large 104 Serial / PS2	760

## Scanner

HP 4200/5200/6200C	368/455/730
HP 6250C / PhotoScanner	909/824
Epson GT7000	381
Patrol 3D Optical 300X600 36 Bit/150	
Artec 1236P/AT6/AT12 180/200/316	

## Printer

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Epson LQ2070	830
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Stylus 740/850/900	484/659/734
Epson Stylus Photo 700/Ex 411/736	
Epson 1520/3000 A2 Size/1018/3258	
HP 695C	261
HP 710C	326
HP 880C USB Cable	540
HP 1120C A3 Size	848
HP 1600C	2265
HP 1600CM	995

## System

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HP LaserJet 1100A with Scan	909
HP Colour LaserJet 5/5M 5387/7074	
HP LaserJet 4000/T	2262/2765
HP LaserJet 4000N/TN	2752/3401
HP LJet 5000/N/GN	2921/4193/5179
HP LJet 8000/N/DN	4764/5285/6143
HP OfficeJet Laser 3100	1411
HP OfficeJet 710C/1170C	954/1427
HP OfficeJet 1175C	1794
BJC 50/80	571/331
BJC 265 /4310	145/203
BJC 5000 A3 Size Colour	491
BJC 5500 A2 Size	1217
BJC 7100	491
Canon LBP 660 Laser	492
BJC 880 A3 4M	4750
Canon C30 Multifunction printer	900

## System

IBM-333/366MX	1537/1563
AMDK6 II 350/400MMX	1596/1643
AMDK6 II 450MMX	1700
Intel Celeron 333A/366A	1608/1624
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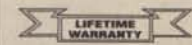
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NEC - Versa E, 4000	32mb 228		
NEC - Versa LX, SX	64mb 186		
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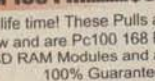
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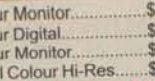
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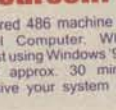
These 40X CD ROM drives still work in the older style 486 systems. They are all name brand and are brand new! Don't miss out on this very rare CD ROM.



### D.I.Y Pentium Upgrade Kit!

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Hard Disk	6GB	6GB
Screen	10.4" TFT	13.3" TFT
Display	800 x 600	1024 x 768
CD-ROM	No	No
Mic & Spkr	Yes	Yes
Battery Life	3+ hours	2+ hours
Port replicator	No	No
Select bay	No	No
DVD capable	No	Yes
Weight	1.4 kg	1.9 kg
Warranty		3 Years
DAA modem	Yes	Yes
Op. System	Win 95/98	Win 95/98
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Processor	<b>Celeron</b> 400MHz	<b>Celeron</b> 400MHz	<b>Celeron</b> 400MHz	<b>Celeron</b> 400MHz	<b>Pentium II</b> 400MHz
RAM Std/Max	64/192 MB	64/192 MB	64/192 MB	64/192 MB	64/192 MB
Hard Disk	4GB	6GB	6GB	4GB	6GB
Screen	13.0" DSTN	12.1" TFT	14.1" TFT	14.1" TFT	14.1" TFT
Display	800x600	1024 x 768	1024 x 768	1024 x 768	1024 x 768
CD-ROM	20x max.	20x max.	20x max.	20x max.	20x max.
Mic & Spkr	Yes	Yes	Yes	Yes	Yes
Battery Life	2.5+ hours	2.5+ hours	2.5+ hours	2.5+ hours	2.5+ hours
Port replicator	Yes	Yes	Yes	Yes	Yes
Select bay	No	No	No	No	No
DVD	No	No	2.4x	No	2.4x
Weight	3.1 kg	3.1 kg	3.1 kg	3.1 kg	3.1 kg
Warranty					
DAA modem	Yes	Yes	Yes	Yes	Yes
Op. System	Win 95/98	Win 95/98	Win 95/98	Win 95/98	Win 95/98
Rent 3 Yrs.**	\$26.67/wk*	\$33.69/wk*	\$33.93/wk*	\$32.46/wk*	\$44.91/wk*
Inc Tax	<b>\$3529</b>	<b>\$4458</b>	<b>\$4490</b>	<b>\$4295</b>	<b>\$5942</b>
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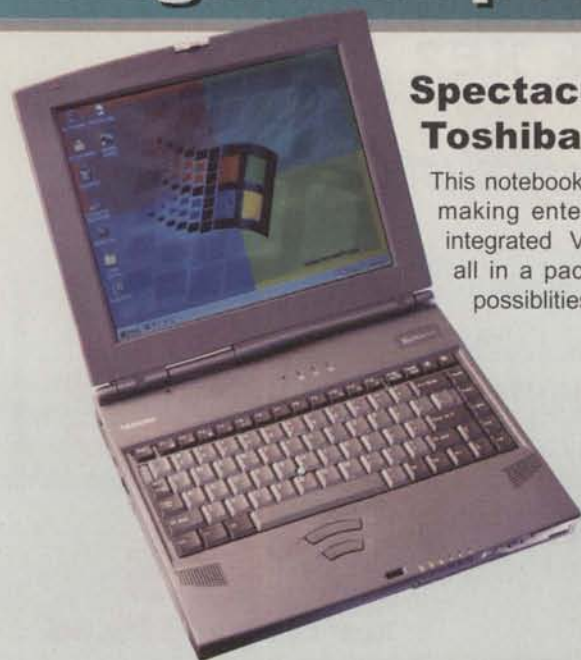
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RAM Std/Max	64/256 MB	64/256 MB	64/256 MB	64/256 MB
Hard Disk	6GB	6GB	6GB	10GB
Screen	13.3" TFT	14.1" TFT	14.1" TFT	14.1" TFT
Display	1024 x 768	1024 x 768	1024 x 768	1024 x 768
CD-ROM	24x max.	24x max.	24x max.	24x max.
Mic & Spkr	Yes	Yes	Yes	Yes
Battery Life	3+ hours	3+ hours	3+ hours	3+ hours
Port replicator	Yes	No	No	No
Select bay	Yes	Yes	Yes	Yes
DVD capable	No	No	No	No
Weight	2.9 kg	2.9 kg	2.9 kg	2.9 kg
Warranty				
DAA modem	Yes	Yes	Yes	Yes
Op. System	Win 95/98	Win 95/98	Win 95/98	Win 95/98
Rent 3Yrs.**	\$Call/wk*	\$Call/wk*	\$Call/wk*	\$Call/wk*
Inc Tax	<b>\$5,250</b>	<b>\$5,459</b>	<b>\$6,999</b>	<b>\$7,905</b>
Part number	(77263)	(76069)	(79086)	(79071)

Op. System	Win NT 4.0	Win NT 4.0	Win NT 4.0	Win NT 4.0
Rent 3Yrs.**	\$Call/wk*	\$Call/wk*	\$Call/wk*	\$Call/wk*
Inc Tax	<b>\$5,396</b>	<b>\$5,590</b>	<b>\$7,199</b>	<b>\$7,995</b>
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\*\* Limited availability for both Tecra 8000 Celeron 333MHz Win95/98 & NT models

### TOSHIBA UNIVERSAL AC ADAPTER

For Tecra 8000/Satellite 4000/4010 and others (44200)

**\$134**

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**\$205**

Note Prem Mobile Office Koskin Bag (01761)

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**\$199**

32MB for Portege 3020 (77228)

**\$217**

64MB for Tecra 8000/ Portege 7000/ Satellite 4000 (29348)

**\$350**

64MB for Portege 3020 (77229)

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For more options, call Harris Technology or see Web Direct Link.

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## HP Jornada 820 Palmtop



- 8.2" VGA Screen (640 x 480 at 256 colours)
- 190MHz StrongARM RISC processor
- 16MB RAM (32MB max.)
- 16MB Burst Mode ROM
- Windows CE 2.2
- Microsoft Pocket editions of Word, Excel, Powerpoint Outlook and Internet Explorer (71162)

**\$1,799**

## Jornada 420

- \* Brilliant 256 colour display 240x320 pixel LCD, CSTN
- \* Hitachi SH7709a 32bit processor operating at 100MHz and 8MB RAM memory (74453)

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## HP Omnibook XE2

333MHz Intel Pentium II/Celeron  
32 or 64MB SDRAM  
4 or 6GB HDD  
Choose from 12.1" HPA or 12.1" or 13.3" TFT screen  
24x CD-ROM drive

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From: (78620)

**\$3,150**

Rent\* T.A.P.\*\* for **\$23.86**  
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#	Processor	HDD	RAM	OS	Screen	Rent/Week	Price
(78620)	C300MHz	4GB	32MB	Win 95/98	12.1" HPA	<b>\$23.82</b>	<b>\$3,150</b>
(79039)	C333MHz	4GB	32MB	Win 95/98	12.1" TFT	<b>\$26.14</b>	<b>\$3,459</b>
(79040)	P II 333MHz	6GB	64MB	Win 95/98	13.3" XGA	<b>\$35.50</b>	<b>\$4,697</b>



## HP OmniBook 900

300/366MHz Intel Pentium II  
32MB SDRAM std  
4 or 5.9 GB HDD  
12.1" SVGA TFT screen  
Optional CD-ROM drive  
Full size keyboard, Dual Pointing Devices  
32-bit PCI bus video & graphics controller  
2.5MB Video RAM

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Additional:

(62095) 32MB RAM

**\$178**

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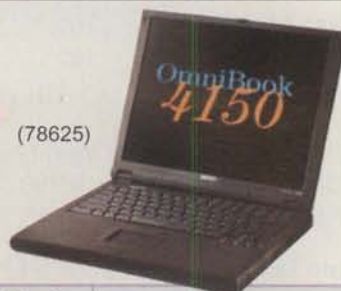
#	Processor	HDD	RAM	OS	Screen	Rent/Week	Price
(73315)	P II 300MHz	4GB	32MB	Win 95/98	12.1" TFT	<b>\$29.66</b>	<b>\$3,925</b>
(73316)	P II 300MHz	4GB	32MB	Win NT	12.1" TFT	<b>\$30.96</b>	<b>\$4,096</b>
(73317)	P II 366MHz	6.4GB	32MB	Win 95/98	12.1" TFT	<b>\$30.01</b>	<b>\$4,597</b>
(73313)	P II 366MHz	6.4GB	32MB	Win NT	12.1" TFT	<b>\$36.20</b>	<b>\$4,790</b>

## HP OmniBook 4150

300/366MHz Intel Pentium II  
64MB SDRAM std  
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14.1" SVGA TFT screen  
16-bit Sound Blaster Pro compatible sound

From **\$4,379**

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(78619)	P II 300MHz	4.8GB	64MB	Win NT	14.1" TFT	<b>\$34.38</b>	<b>\$4,549</b>
(76972)	P II 366MHz	6.4GB	64MB	Win 95/98	14.1" TFT	<b>\$45.30</b>	<b>\$5,995</b>
(76971)	P II 366MHz	6.4GB	64MB	Win NT	14.1" TFT	<b>\$47.60</b>	<b>\$6,298</b>

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\*\* Product image is normal desktop not Small Form Factor

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Latest technology

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\*\* Rent per week figure based on configurations with 15" Monitor. Rental rate for business use, includes stamp duty and FID for NSW. Enquire for slight variations in other states. T.A.P.

Processor	HDD	Part #	OS	Price Without Mon	Price* With 15" Mon
VLi8 CA 400MHz	Lan	4.3GB (75836)	Win95	<b>\$1,699</b>	<b>\$2,228</b>
VLi8 PII 400MHz	Lan	4.3GB (75972)	Win95	<b>\$1,999</b>	<b>\$2,528</b>
VLi8 PII 400MHz	Lan/CD	8.4Gb (75838)	Win NT	<b>\$2,499</b>	<b>\$3,028</b>
VLi8 PIII 450MHz	Lan/CD	8.4GB (75840)	Win NT	<b>\$2,799</b>	<b>\$3,328</b>

\*HP Ultra VGA 15" Monitor

(73463) **\$529**

#### HP Monitors

HP 15"  
Monitor  
(72507)

**\$399**

HP 17"  
Monitor  
(65211)

**\$699**

HP 19"  
Monitor  
(78152)

**\$1059**

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(76019)

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**HP E-60 Model 2 - Pentium II 450MHz**  
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(76020)

**\$4,439**



**HP E-60 Model 3 - Pentium III 500MHz**  
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##### HP ProCurve Hub-12

- 12 Port 10BaseT
- Unmanaged hub

##### HP SureStore DAT 8i Tape Drive

##### HP 15" Monitor

**\$5,635**

## HP Procurve

#### HP ProCurve 212M

12 x RJ-45 10BaseT ports, 1xRJ-45 autosensing 10/100 BaseT 1 x open 10/100 Mbps transceiver port

(75511)

**\$995**

#### HP ProCurve 224M Switch



Ideal for low-cost dedicated 10Mbps desktop switching for small to mediumsize groups of users.

- Ports: 24 x RJ-45 10BaseT ports, 1 x RJ-45 autosensing 10/100BaseT port, 1 x open 10/100Mbps transceiver port
- IP multicast software prevents flooding of multicast video traffic and supports QoS for IP multicast traffic
- Full duplex on all ports for maximum performance

(71576)

**\$1,395**

#### HP Procurve Switch 2424M



Desktop switch ideal for low-cost migration to 10/100 stackable switching:

- 24 10/100Base-TX autosensing ports
- Open module slot for Gigabit stacking and uplinks
- Managed
- Low, industry-leading price

(75513)

**\$2,660**

#### HP ProCurve 2224 Switch



Low-cost desktop switch ideal for delivering performance to workgroups with a mix of 10Mbps and 100Mbps devices and for migrating from 10Base-T to 100Base-TX:

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- One open transceiver slot
- Unmanaged
- Low, industry-leading price

(75515)

**\$1,737**

#### HP ProCurve 4000M Switch



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(66063)

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- PS/2 104 Key Keyboard
- Windows 95 or 98

- **AMD K6-2 350MHz Processor**

- 32Mb SDRAM
- Midi-Tower Case
- 1.44 Floppy Disk Drive
- 10Mb Combo Network Card
- PS/2 Wheel Mouse
- 3 Years On-Site Warranty

Plus 15" Monitor add

**\$339**

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(77296) **\$1,189**

**\$1,528**

### Intel Celeron

(77297)

**\$1,199**

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- Windows 95 or 98

- **Intel Celeron 333MHz Processor**

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- Midi-Tower Case
- 1.44 Floppy Disk Drive
- 10Mb Combo Network Card
- PS/2 Wheel Mouse
- 3 Years On-Site Warranty

Plus 15" Monitor add

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(77300)

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- PS/2 104 Key Keyboard
- Windows 95 or 98

- **Intel Pentium II 350MHz Processor**

- 4.3Gb Hard Disk Drive
- Midi-Tower Case
- 1.44 Floppy Disk Drive
- 10Mb Combo Network Card
- PS/2 Wheel Mouse
- 3 Years On-Site Warranty

Plus 15" Monitor add

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T.A.P.\*\**

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- Mobile Celeron 300MHz processor
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- 32MB SDRAM memory (up to 256MB maximum)
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- Microsoft Windows® 98
- Weighs 3.4kg

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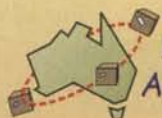
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# IBM PC300GL Desktops

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## PC 300GL PII 400MHz

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- 64MB 100Mhz SDRAM
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- Graphics Chipset: S3 Trio3D AGP, 4 MB
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- Monitor not included

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## PC 300GL PII 400MHz



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- Graphics Chipset: S3 Trio3D AGP, 4 MB
- CD-ROM 32x
- Operating System: Windows® 98

Model 6277-70A without Monitor  
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(65992)**\$485**

### PC 300GL

Model 6287-32A  
(76056)Includes 15"  
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17.3"

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**Cobalt Graphics Chipset**, the heart of the Silicon Graphics 320 and 540 systems, includes high-performance 2D and 3D graphics processing, S-video, composite video, CD-quality audio, USB, and IEEE-1394, as well as three available PCI slots on two PCI-64 buses. Other features of the Cobalt™ graphics chipset which provide the stunning graphics performance include:

- \* Hardware acceleration of 3D geometry, lighting, transforms, texturing, rendering and rasterization functions
- \* Dynamically allocated memory that supports almost 1GB of texture memory
- \* Extremely fast pixel fill
- \* Real-time transfer of two simultaneous streams of video I/O
- \* Support for resolutions up to 1920x1200 (24-bit double buffered)

SGI Systems have been designed with these applications in mind

**3D Modelling:** Creating & manipulating complex 3D models call for staggering amounts of system resource which only SGI systems can deliver.

**Image editing and Manipulation:** High resolution 2D images are becoming popular in DTP, only SGI systems have capabilities to handle this.

**Video Editing:** Silicon Graphics 540 Visual Workstation supplies the professional video interfaces & high systems bandwidth needed to work with un/compressed analog & digital video in real time.

**Analysis:** Silicon Graphics 540 Visual Workstation provides analytic capabilities far beyond most personal workstations. No other system has the power of an SGI.

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- Integrated V.90/K56flex modem
- Integr. AC adaptor
- Windows® 95

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(78188)

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- 2MB SGRAM
- Removable Floppy & 4.0Gb hard drives
- 24x Max CD-ROM
- External AC Adaptor
- TouchPad
- Windows® 95

### COMPAQ Deskpro EN



The Deskpro EN offers outstanding consistency, serviceability/manageability for enterprise environments.

- Intel P II 400MHz processor
- 6.4GB SMART II Ultra ATA HD
- 32MB SyncDRAM
- 512KB L2 Pipeline Cache
- 8MB Video Memory
- Windows® 95
- Integrated V.90/K56flex modem
- ATI RagePro Turbo AGP 2x with 4MB SGRAM (expandable to 8MB)

With 15" Monitor **\$2,138\*\***  
(66858 + 75862)

Rent\* **\$16.16** per week over 3 years, T.A.P

See Web Direct for pricing and availability on options



### COMPAQ Deskpro EP

The Deskpro EP delivers optimum price/performance in an easy-to-use desktop.

- Intel 400MHz processor
- 32MB SDRAM expandable to 384MB
- 4.3Gb SMART II Ultra ATA hard drive
- 1.44MB Diskette drive
- Matrox MGA-G100 AGP Graphics Card with 4MB SGRAM video memory, 6 Slots, 5 Bays: 2 USB, 2 serial, 1 parallel, keyboard mouse, monitor ports
- Windows® 95



With 15" Monitor  
(73075 + 75862)

**\$1,688\*\***

### COMPAQ Deskpro EP

The Compaq Desktop EP series of personal computers delivers long-lasting performance and powerful technology at the right price.

- Intel Pentium II 400MHz processor
- 64MB SDRAM, expandable to 384MB
- 10GB SMART II Ultra ATA hard drive
- 1.44MB diskette drive
- Matrox Millennium G200-SD AGP with 8MB SDRAM video memory
- 16-bit audio and Windows® 95

With 15" Monitor  
(70285 + 75862)

**\$2,374\*\***

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**HARRIS  
TECHNOLOGY™**

Pricing\*\* and specifications herein are subject to change without notice



All prices include sales tax & subject to change w/o notice



**3Com** More connected.™

Web  
Direct

[www.ht.com.au/cat/3com](http://www.ht.com.au/cat/3com)

## Palm™ Family of Connected Organisers



### Excellent Palm™ Computing from Harris Technology



Palm™ connected organisers manage life's little details. It will help you stay on top of things everywhere you go. You can store thousands - literally thousands - of names, addresses, phone numbers, to-do's, and expenses, plus hundreds of e-mail messages. The best part? You can synchronise all your information with your computer at the touch of a button. More features: Infrared communication. Access your e-mail with the Palm Modem® accessory. Applications: Date Book, Address Book, Mail, To-do List, Memo Pad, Expense, Calculator, Security, Games, HotSync®.

## Palm IIIx™

Connected Organiser

More of a good thing



The Palm IIIx™ organiser gives you twice the memory of the Palm III™, and an open connector slot for room to expand. New advanced LCD screen technology improves viewing in dim light conditions or bright sunlight. Stores approximately:

- 12,000 addresses
- 5 years of appointments
- 3,000 to-do items
- 3,000 memos
- 400 e-mail messages
- and lots of third-party applications.

(74373)

**\$720**

#### Intellisync Software for Palm Pilot

Excellent Conduit software to work with the Palm IIIx. Enables users to sync their PalmPilot organizer with common personal info mgt, contact mgt & group scheduling applications.

(65266)

**\$145**

## Palm III™

Connected Organiser

Award winning!



At just 12 cm tall and 161 grams (batteries and all), it is small enough to fit in your shirt pocket or purse, and powerful enough to keep you organised anywhere you go.

Stores approximately:

- 6,000 addresses
- 5 years of appointments (approximately 3,000)
- 1,500 to-do items
- 1,500 memos
- 200 e-mail messages
- and lots of third-party applications.

(59857)

**\$595**

## Palm V™

Connected Organiser

Slim, sleek and elegant



Sleek design, anodised aluminium case. Only half the thickness of a Palm III. All your names, addresses, phone numbers, appointments, to-do's and email messages right at your fingertips. Recharge in minutes a day. And, a full charge lasts for up to a month. Stores approximately:

- 6,000 addresses
- 5 years of appointments
- 1,500 to-do items
- 1,500 memos
- 200 e-mail messages
- and lots of third-party applications.

(74294)

**\$894**



Palm Slim  
Leather Case  
(63801)

**\$49**



Palm III  
3 Stylus  
(60675)

**\$22**



Palm III  
Cradle  
(60673)

**\$62**



Palm V  
Cradle  
(74669)

**\$92**



Palm V  
Leather Belt  
Clip Case  
(74673)

**\$48**



Palm V  
Modem  
(74668)

**\$349**

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Direct

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## New Heights of Productivity

### Software included:

# Outlook applications:  
Tasks,  
Contact,  
Calendar,  
Inbox for  
e-mail  
# Note Taker  
# Jot Natural  
Handwriting  
Recognition  
# Voice  
Recorder  
# E-mail  
# Channels  
# Calculator  
# Dual-Time  
World Clock  
# Solitaire  
#CASIO  
Compact  
Backup &  
Restore  
# CASIO  
Menu  
And much  
more!



(76516)

**\$799**

**More  
Power**

- Windows CE 2.11 Operating System
- 69MHz Processor
- 16Mb upgradeable ROM
- 16Mb RAM
- Type II Compact Flash Card Expansion Slot

**Multi-  
Media**

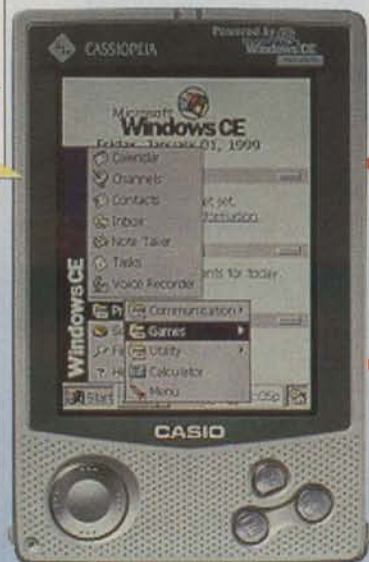
- 16 Grey-Scale FSTN TFT Screen (viewable in most extreme light conditions)
- With add-on software you can do:
  - › Web Browsing, Play MP3 files
  - › Personal Information databases

**Greater  
Functionality**

- Recharge NIMH batteries with cradle
- Action switch and Cursor pad
- Bright backlight for poor light conditions
- CASIO Menu for simple access to application
- Backup data to Compact Flash (no PC needed)

## World Smallest Multimedia Palm-size Device

### Cassiopeia E-100



(76521)

**\$1,136**

**More  
Power**

- Windows CE 2.11 Operating System
- 131MHz Processor
- 16Mb upgradeable ROM
- 16Mb RAM
- Type II Compact Flash Card Expansion Slot

**Multi-  
Media**

- 16-bit Active Matrix TFT Colour Screen (65536 colours)
- With add-on software you can do:
  - › Web Browsing, Play (in stereo) MP3 files
  - › Show MPEG Video and Music files
- Stereo output Jack

**Greater  
Functionality**

- Action switch and Cursor Pad
- Contrast power save modes
- Brightness power-save modes
- CASIO Menu for simple access to applications
- Recharge Lithium-ion batteries with cradle or direct

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**HARRIS  
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Rent: Short or long term. Finance options available: IBM Easylease, AGC.



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# Xircom

Check here for the latest information and pricing

Web  
Direct

[www.ht.com.au/cat/xircom](http://www.ht.com.au/cat/xircom)

## Data Fax Modems & Ethernet Cards



CreditCard  
56K  
modem

(54763) **\$320**



CreditCard  
10/100  
Upgradeable

From  
(27310) **\$246** UTP



10Mbps  
Pocket  
Ethernet

(10257) **\$526** Coax



Creditcard  
10/100BTX  
Ethernet +  
56K Modem + MiniDock

From  
(56359) **\$547**



CardBus  
10/100  
Ethernet  
Adapter

(38605) **\$299**



Credit Card  
GSM II  
Modem

Ericsson compatible  
(55026) **\$359**



MiniDock  
Connector  
System

(55838) **\$58**



To enjoy anytime,  
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Promotion today!

## Be GSM Active!

Until 31st August 1999, you  
can enjoy 54% savings on the  
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**\$109**

(Normal price: \$239 !!)

(75962,68261,68262)

Mobilise your office now with a  
Xircom GSM Connection Kit!

- ✓ Stay in touch with your business, surf the Internet or access email and critical information when you travel
- ✓ Connects to your GSM
- ✓ No hunting for telephone wall sockets
- ✓ Anytime, anywhere communications

Give the  
Harris  
Technology  
Call Centre  
a call on  
1300 13  
9999 to find  
out which  
Xircom  
Connection  
Kit supports  
your GSM.



Xircom

### RealPort Value 56 Modem

High speed 56K modem functionality for notebooks. All connectors are integrated into the card providing a robust, reliable and easy-to-use solution. With no cables to lose and no moving parts to break, the RealPort Value 56 Modem will save you money with fewer support calls, less user downtime, no more need for cable replacement.

(72923) **\$258**



Xircom

### RealPort Ethernet 10/100 + Modem 56

Combines 10/100Mbps Ethernet, 56K modem, GSM, AMPS cellular and ISDN connectivity, in a single cable-free Integrated PC Card solution. No custom cables to lose, no pop-out jacks to snap and leave you stranded. GlobalACCESS™ features make it easy to connect to information from any location, anywhere in the world. GSM upgradeable.

(61795) **\$629**



Xircom

### RealPort Ethernet 10/100

RealPort Integrated PC Card LAN solutions offer mobile users high-performance 10Mbps and 100Mbps Ethernet connectivity for the most reliable access to information while in the office.

Easy to use • Robust integrated connectors • Uses standard RJ-45 Ethernet cord • Longer battery life • Full-duplex Ethernet at 10Mbps

(67216) **\$275**



Lucent  
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Innovations

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Nokia  
5110  
&  
6110

for  
**RealPort™  
products**

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E-mail [sales@ht.com.au](mailto:sales@ht.com.au)

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275 Alfred St  
North Sydney



# Banksia

Have a look here for the latest pricing and information ↓

Web Direct

[www.ht.com.au/cat/banksia](http://www.ht.com.au/cat/banksia)

## It's your world. Be there.

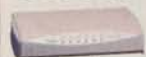
### Banksia Intra 4

4x Dual Mode K56 Flex/V.90 Data Modems on ONE PCI Board

(65782)

**\$1,127**

### Banksia Comm-Server



Communications and remote access server with an Ethernet connection, provide shared inwards and outwards communications over an office Ethernet LAN.

4 ports  
(58577)

**\$998**

## Banksia PCCard56

- Dual Mode V.90 and K56flex
- Global capable can be used almost anywhere in the world
- GSM ready (GSM kits sold separately)
- 14,400bps fax



**\$Call**

New Product

## ★ WINDOW to the FUTURE ★

Coming soon:

### Banksia EasiHub™

**\$99 RRP**

The **EasiHub** provides a low cost effective USB port expander for use with either a notebook or desktop USB compliant PC.

- Hosts 4 USB downstream ports.
- Unique design.
- Works with iMac and G3 workstations
- Features individual port and power LED indicators
- Two Amp Power adaptor included.

### Banksia EasiHub56™

**\$199 RRP**

The **EasiHub56** USB modem is a 3-port USB hub that uniquely includes an in built V.90 56Kbps USB host modem. Providing data transfer rates of up to 12Mbps between the computer and all connected USB peripherals, the **EasiHub56** simultaneously supports up to three full-speed USB devices. It also incorporates all the functionality of an advanced V.90 56Kbps host modem, providing super-fast Internet downloads and faxing capabilities. The combination of the modem into the hub, provides the user with the best USB hub-modem solution, in terms of cost, compact design, and functionality.

- Hosts 3 USB downstream ports and an RJ11 port.
- Unique built in Dual Mode V.90 and K56flex modem.
- Features individual port and power LED indicators
- Two Amp Power adaptor included.
- Ideal for the mobile PC user.

# NetComm

Web Direct

Order on line at:

[www.ht.com.au/cat/netcomm](http://www.ht.com.au/cat/netcomm)

## Communicate with NetComm

### NetComm Roadster II 56 USB

- Designed for Windows 98.
- Fully featured USB modem, means no bulky power supply required
- Includes headset and microphone
- Comes bundled with Symantec WinFax Pro



New Product

**\$Call**

Now with Ultra Connect Technology

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# HARRIS TECHNOLOGY™

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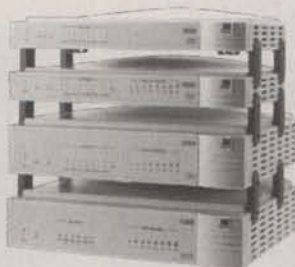
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# More connected with 3Com

## HUBS & SWITCHES

**3Com** High Density Plug and Play  
Ethernet Switch for Small  
Businesses



OfficeConnect hubs are designed for scalability: you increase port density only when you need it. As your business grows your OfficeConnect network can expand easily by connecting additional devices.

OfficeConnect Hub 8/TP0	(26769)	<b>\$195</b>
OfficeConnect Hub 8/TPC	(31137)	<b>\$237</b>
OfficeConnect Hub 8/TPM	(28873)	<b>\$725</b>
OfficeConnect Hub TP4 COMBO	(39541)	<b>\$179</b>

The OfficeConnect networking includes everything you need to network two or more personal computers including NICs, hubs, cables and complete easy to use documentation.

**OfficeConnect SME 2 User Kit** **\$284**  
(79020)

**Kit includes:**

- One OfficeConnect Hub TP4
- Two EtherLink III ISA 10BaseT NIC
- Two 0.76m UTP cables
- An external power supply

**OfficeConnect SME 3 User Kit** **\$428**  
(57134)

**Kit includes:**

- One OfficeConnect Hub 8/TPC
- Three EtherLink III ISA 10BaseT NIC
- Three 1.52m UTP cables
- An external power supply



With plug and play installation and no configuration required, the switch is supremely easy to use. Provides full wire-rate Ethernet and Fast Ethernet switching for your unmanaged office network.

OfficeConnect Switch 400	(67221)	<b>\$772</b>
OfficeConnect Switch 800	(78967)	<b>\$766</b>

## PC CARDS

**3Com** Megahertz® 56K Global Modem  
PC Card with XJACK



Hassle-free access and  
high-speed downloads  
anytime, anywhere

(73899)

**\$379**

A 3Com Megahertz modem PC Card with XJACK connector is the easiest way to connect to a standard phone cord. With download speed of 56Kbps\* and V.90 standard, the XJACK PC Card has universal compatibility with V.90, X2, and other industry standards. Durable connector delivers easy phone connections and saves you from cable-carrying hassles.

\* Capable of receiving downloads at up to 56Kbps and sending at up to 31.2Kbps. Actual download speeds you experience maybe lower due to varying line conditions. Requires compatible analogue phone line and server equipment.

## 3COM US ROBOTICS MODEMS

**3Com** 56K V.90 Modem Range  
More connected.

**56K Fax Modem** (63833) **\$168**  
(pictured)

**56K V.90 Voice Fax modem** (61303) **\$219**

(Pictured is  
USA model)

**BOTH modems feature:**

- Fax forwarding
- Delayed and broadcast sending
- Send faxes from any windows application
- Send and receive while running other applications
- Faster internet downloads for a more exciting and rewarding online experience

**The Voice Fax modem ALSO features:**

- Personal voice mail
- Full duplex speaker phone and fax

**56K Message Modem** (70929) **\$259**

**56K Professional Message Modem** (70928) **\$319**  
(pictured)

**BOTH modems feature:**

- Answering Machine
- Message Management
- Store Voice and Fax messages
- Flash ROM upgrade

**The Professional Message Modem ALSO features:**

- Full duplex speakerphone
- Record faxes and voice messages while your PC is switched off



**3Com**  
**Megahertz**  
**56K Global**  
**PC Card**  
**V.90**  
(58084)  
**\$274**

**3Com**  
**Etherlink**  
**10/100**  
**Cardbus**  
**PC Card**  
**with**  
**XJACK**

(74695)

**\$302**

**3Com**  
**MegaHertz**  
**10MBPS**  
**LAN PC**  
**Card With**  
**XJACK**

(65746)

**\$269**



**Back-Ups  
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PC's!**

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(56229)

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**\$245**  
(56230)

650va  
**\$355**  
(56231)

**Power-  
Chute®  
Plus**

for Windows®  
**\$96**  
(42950)

for Win NT  
**\$129**  
(19558)



**APC  
Symmetra**  
4-16 kVA  
Power Array  
**\$Call**  
(71087)

So good  
we use it  
ourselves!

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# Power Back Up = Power Protection

## APC Back-UPS Pro SI® For Home and Office PC's

- PowerChute plus software
- Additional outlet for protection of printers
- Audible Alarms
- Phone/modem protection
- User replaceable, hot swappable batteries



APC Back-UPS Pro 280si (76636)

**\$325**

APC Back-UPS Pro 420si (76637)

**\$399**

APC Back-UPS Pro 650si (76638)

**\$535**



## APC Smart-UPS®

For small office servers

- Includes FREE APC PowerChute® Plus
- Hot-swappable, user-replaceable batteries
- SmartBoost™ /SmartTrim™ for maximum on-line operation from 156-300 volts.
- Three battery back-up/surge protection outlets
- One surge outlet for printers, faxes, scanners etc.
- 10 Base-T/100 Base-TX network protection



APC Smart-UPS 420

(67199) **\$499**

APC Smart-UPS 620

(67198) **\$679**

See the APC Web based sizing guide to help you select the appropriate UPS: [www.apcc.com](http://www.apcc.com)

## APC PowerStack Power Protection®

For Hubs/Switches/Routers



- Rackmountable (1U)
- Regulates low quality power for continued on-line operation
- User replaceable, hot swappable batteries
- Powers upto 4 devices
- PowerChute plus software

APC PowerStack 250 (78992)

**\$689**

APC PowerStack 450 (78991)

**\$865**





## Smart Storage Solutions



### Click! PC Card (78902) Drive **\$364**

The new Iomega Click!™ PC Card Drive is an integrated, high-capacity removable solution for notebook users. This sleek, compact drive, which fits into a notebook's Type II PC Card slot, allows users to store, protect and share their important information on a 40MB Click! Disk.

Click! disks 2-pack (75984) **\$59**  
Click! disks 10-pack (75985) **\$173**

### Zip 250MB parallel (74450) **\$345**

Light, portable, easy to use and holds more files than ever before! Save your files and take them anywhere! Access files and applications instantly. Backwards compatible with 100MB disks. SCSI/Parallel. Comes with one disk. Iomega tools supplied on CD.

Zip 250MB Drive SCSI (74451) **\$349**  
Zip 250MB disk single (74454) **\$35**  
Zip 250MB disks 10-pack (74452) **\$319**

### Zip USB

(71103)

**\$249**

Now USB-enabled PC users running Windows® 98 can connect Iomega's sleek, translucent ice-blue USB Zip drive, and reap the benefits of simple connectivity and unlimited storage capacity. Once the IomegaWare software has been loaded, remove and swap the Zip drive with other USB devices without rebooting your PC.

### Jaz 2Gb External

(78941)

**\$699**

You've just found the latest removable storage drive from Iomega, the Jaz® 2Gb drive. The Jaz 2Gb is faster than many hard drives, has a full 2Gb of storage space in each removable disk, gives you the freedom to take your files with you, and is backward compatible with industry standard Jaz 1Gb disks.

### Click! Drive (75501) **\$465**

Go anywhere storage for your digital cameras and mobile computers.

This 6 oz. battery-operated handheld drive slips nice and easy into your pocket when you are on the go and need our stuff. Each 2-inch-square Click! disk holds an 40MB of re-writable, removable storage for your mobile stuff. You've now got the space to go anywhere!

Click! Drive Mobile (76743) **\$539**  
Click! Battery (78920) **\$89**  
Click! Power Supply (78925) **\$30**

### Zip Starter Kit (70623) **\$255**

Get started with the Zip starter kit! It's a portable parallel interface Zip drive plus four fun and practical, coloured 100MB Zip disks that are ideal for colour coding all of your computer stuff in the office, at home, at school, or anywhere. The colours make it even easier to find what you are looking for.

### Zip Internal ATAPI

(16629)

**\$199**

Fast, easy backup and archiving of your important information. Expand your hard drive without limits, 100MB at a time. High performance without the need or expense of SCSI connections. Connects to internal hard drive controller using standard IDE/ATAPI interface and internal power supply. Fits inside a standard 3.5" or 5.25" drive bay.

### buz

(78664)

**\$359**

The easiest way to get multimedia from camcorders, DVD, CD-ROMs, VCRs and laserdiscs into your PC!

It's a video capture and editing board combined with an Ultra SCSI controller that lets you capture multimedia (full motion video, sounds, digital pictures, music) into a PC, edit it using the easiest software around, and share it using Jaz or Zip disks, VCR tapes or the Internet.

Zip 100MB disk (23772) **\$19**

Zip 100MB disks 10pack (21889) **\$190**

Zip PCMCIA SCSI accelerator card (35145) **\$189**

Zip carry case (31823) **\$57**

Zip parallel cable (46305) **\$40**

Zip SCSI cable (46304) **\$40**

Jaz 1GB disk (24218) **\$179**

Jaz 1GB disk 3-pck (32844) **\$490**

Jaz 2GB disk (61652) **\$179**

Jaz 2GB disk 3pck (57271) **\$548**

Jaz Jet - PCI SCSI controller (31591) **\$189**

Jaz PCMCIA SCSI card (44744) **\$215**

Jaz cable converter (46306) **\$27**

Jaz universal power supply (35154) **\$56**

Jaz Traveller (32860) **\$89**



# NETGEAR™

Web  
Direct

[www.ht.com.au/cat/netgear](http://www.ht.com.au/cat/netgear)

## Network Disk Drives

Designed  
for SOHO

### NETGEAR Network Disk Drives: The easiest and fastest way to add extra hard drive capacity to your network



NETGEAR Network Disk Drives are the first information appliances to use high speed networking technology to simplify the use and installation of storage space

on the network. By using a high speed network instead of adding internal hard drives you can add disk capacity for storing customer files, pictures, applications, or any other data quickly and easily.

Available in 8GB and 20GB

(79013) Netgear ND508  
8MB Network Disk Drive

**\$1,365**

WOW!

(79014) Netgear ND520  
20MB Network Disk Drive

**\$2,250**

➔ Increase your hard drive capacity without going through the hassle of adding internal hard drives

➔ One-step installation on your PC. No complicated server setup or hardware installation required

➔ At 100Mbps the Netgear Network Disk Drive provides performance close to that of an internal hard drive

➔ Accessible to anyone connected to the network

➔ Microsoft, Unix, Novell compatible

➔ Free Netgear 24x7 support

VideoBytes

# WACOM

Web  
Direct

[www.ht.com.au/cat/wacom](http://www.ht.com.au/cat/wacom)

## Wacom PenPartner and Intuos

**Wacom Intuos** The powerful high resolution mini-tablet for space conscious graphics professionals. The Intuos intelligent graphics tablet system is the ultimate set of master tools for creative professionals. With the tablet and the Intuos Pen at the heart of the system, you'll paint more intuitively, illustrate with greater freedom and edit imagery faster than ever before. Senses every change in hand pressure. Optional accessories are Intuos Airbrush, Lens cursor, inking and stroke pens. Expand your system with a 4D mouse which gives you control over rotation x,y and z coordinates, and allows you to create in 3D space. **Bundled with Painter Classic and Pen Tools software worth \$200.**

**Wacom PenPartner USB** An affordable, intuitive and fun way to paint, draw and edit images on a computer. Perfect for those who prefer the absolute control a pen brings you. Ideal for handwriting software and photo retouching. It's cordless, batteryless, pressure sensitive. Draw expressive pencil lines or make sensitive strokes with an airbrush, paintbrush, crayon, piece of chalk or felt pen. Flip the pen over and get a pressure sensitive eraser for deleting, softening or feathering. Fast and accurate in any program. Bundled with Painter Classic, Pen Office SE and Pen Tools.

Intuos available in  
Serial & ADB interface.  
PenPartner available  
in USB interface.

Intuos 4x5 with Pen

(69551) **\$324**

Intuos 6x8 with Pen

(69552) **\$539**

Intuos 9x12 with Pen & 4D mouse

(69553) **\$739**

Intuos 12x12 with Pen (72287)

**\$755**

Intuos 12x18 with Pen (72286)

**\$1,140**

Pen Partner 4x5 (USB) (76011)

**\$228**

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# HARRIS TECHNOLOGY™

Pricing\*\* and specifications herein are subject to change without notice



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or T/T. Call for details.



# NETGEAR™

Web  
Direct

See this Web Direct link for "LIVE" pricing,  
more information or to ORDER ON-LINE

[www.ht.com.au/cat/netgear](http://www.ht.com.au/cat/netgear)

## Take the Work out of Networking

### NETGEAR™ 10Mbps Ethernet Hubs

**EN104TP** 4-port Slimline (53456) **\$75**

**EN108TP** 8-port Slimline (53458) **\$120**

**EN116** 16-port Slimline (53459) **\$230**

- Vista jacks with built-in LED indicators
- Uplink port for network expansion
- From the world-wide hub leader
- Slim, sturdy metal case design
- BNC/AUI backbone support
- Limited lifetime warranty
- Easy Plug and Play Installation



**EN516** 16-port Rackmount (17425) **\$328**

**EN524** 24-port Rackmount (17435) **\$352**

- 16 or 24 10BASE-T ports
- Easy plug-and-play installation
- Vista network port with built-in LEDs
- BNC/AUI backbone support
- Internal power supply
- Lifetime warranty
- Free 24-hour phone support



### NETGEAR™ 10/100Mbps Fast Ethernet Switches

Ask us about NETGEAR Integrated Fibre Switches

**FS104** 4-port Slimline (55171) **\$435**

**FS108** 8-port Slimline (70905) **\$627**



4 or 8 switched 10/100 Mbps ports, auto-speed and duplex mode sensing. Versatile and compatible. Compact and easy to install. Vista jacks with built-in LEDs. From the worldwide leader in hubs and switches.

**FS516** 16-port Slimline (60522) **\$1,604**



Provides powerful, network center performance with all 16 ports capable of 10 or 100 Mbps, half- or full-duplex operation, automatic speed sensing. Ideal

for segmenting networks into small, connected subnets. Vista network ports with built-in LEDs.

**FS524** 24-port Slimline (77549) **\$1,699**

Provides powerful, network center performance with all 24 ports capable of 10 or 100 Mbps, half- or full-duplex operation, automatic speed sensing. Ideal for segmenting networks into small, connected subnets. Vista network ports with built-in LEDs.

### NETGEAR™ Dual Speed Hubs



These Netgear hubs connect multiple PCs to share printers, files, Internet access, and e-mail communications. Mix and

match 10 and 100 Mbps PCs, servers, and peripherals on the same network with ease and without the high cost and complexity of multiple hubs and bridges. All feature easy, plug-and-play installation, Auto-sensing dual speed ports & vista network ports with built-in LEDs.

**DS104** 4-port Slimline (70795) **\$227**

**DS108** 8-port Slimline (18755) **\$366**

Full connectivity among devices. Compact, sturdy, metal case.

**DS516** 16-port Stackable (64389) **\$935**

**DS524** 24-port Stackable (69474) **\$1,163**

Rackmountable, expandable from 8 to 192 users.

### NETGEAR™ Gigabit Switch

#### FS509

8 ports 10/100Mbps + 1 port Gigabit  
Fast Ethernet Switch



**\$1,955** (76840)

This high-performance Fast Ethernet Switch provides eight 10/100 Mbps switched ports and a 1,000 Mbps Gigabit Ethernet port. The switched 10/100 Mbps ports are ideal for segmenting networks into small, connected subnets for superior performance, enabling the most demanding multimedia and imaging applications over the network. The Gigabit Ethernet port is designed for connecting to a server where most traffic goes or connecting to the network backbone to access remote resources.

★ Also ask us about NETGEAR GIGABIT NIC ★

### NETGEAR™

**10BaseT  
Hubs  
from  
\$75**

(53456)



**FA310**  
Ethernet  
Adapter. 10/  
100 PCI  
(Speed  
sensing, PnP)  
**\$68**

(53460)



**FA410**  
PCMCIA  
Network Card  
(60071)  
**\$203**

NETEL  
NETWORKS



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## Small-Medium Business Networks

### D-Link DMF-560TX

PCMCIA 10/100Mb LAN & 56K Modem PC Card

- 10/100Mb Auto sensing LAN port
- V.90 K56 Flex fax/data/modem
- Rockwell Chip Set
- Uses only one PCMCIA type 2 slot
- Concurrent use of LAN and fax/modem
- Simple Plug and Play installation
- Supports Windows 95/98, NT and others
- Fully approved A-Tick, C-Tick, and Telepermit
- For Acer, Compaq, Digital, IBM, NEC, Toshiba notebooks



(72787)

**\$425**

Also available:

Network Adapters

<b>DE-220PCT</b>	(22764)	<b>\$34</b>
ISA bus 10Mb network card/RJ-45/BNC		
<b>DE-660CT</b>	(35862)	<b>\$115</b>
PC Card 10Mb with RJ-45/BNC connectors		
<b>DFE-530TX</b>	(62956)	<b>\$54</b>
PCI bus dual speed 10/100Mb network card		
<b>DFE-570TX</b>	(72786)	<b>\$567</b>
4 port PCI-bus 100Mb Fast Ethernet Server Interface card 4x200Mbps		
<b>DFE-650TX</b>	(56301)	<b>\$179</b>
PCMCIA dual speed 10/100Mb network card		
<b>DFE-660TX</b>	(69449)	<b>\$225</b>
32-bit PCMCIA PC-CardBus dual speed 10/100Mb		

### D-Link DES-1016

D-Link DES-1016 Switch is designed to enhance workgroups performance while providing a high level of flexibility. The DES-1016 allows users to either connect 10Mb or 100Mb connections and boost response time and bandwidth.

- 16 port 10/100Mb dual speed
- Support Full/Half duplex
- Supports VLAN and port trunking



(69456) **\$1,585**

Also available:

Switches

<b>DES-810</b>	(53717)	<b>\$839</b>
10 port Fast Ethernet Switch with 8x10BaseT, 2x100BaseTX		
<b>DES-815</b>	(52206)	<b>\$1,159</b>
16port Fast Ethernet Switch with 12x10BaseT, 3x100Base ports		
<b>DES-1008</b>	(52207)	<b>\$899</b>
8-port dual speed 10/100Mb Smart Switch		
<b>DES-1024</b>	(76740)	<b>\$2,238</b>
24 port dual speed 10/100Mb Smart Switch		
<b>DES-3224</b>	(69457)	<b>\$3,274</b>
24 port dual speed Managed Switch		

### D-Link USB Range

New from the D-Link USB Range:

These Universal Serial Bus hubs connect up to four USB peripherals or devices to their USB-ready PC. It provides out of the box industry standard Bus. It allows PC users to expand the number of USB ports on their systems.



- DU-A2 - PCI Port USB Adapter (78987) **\$49**
- DU-H4 - 4 Port USB Hub (78988) **\$85**
- DU-H3SP - 3 Port USB Hub (78989) **\$185**

Also available:

Non USB Hubs

<b>DE-805TP</b>	(52209)	<b>\$110</b>
5-port 10Mb Hub with external AC Power Supply		
<b>DE-809TC</b>	(10388)	<b>\$145</b>
8-port 10Mb Hub with 1 BNC port		
<b>DE-816TP</b>	(51844)	<b>\$295</b>
16-port 10Mb Hub with 1x AUI/1x BNC Ports (Rackmount)		
<b>DFE-904</b>	(72789)	<b>\$215</b>
4-port 10/100Mb Dual Speed Hub		
<b>DFE-905</b>	(76617)	<b>\$289</b>
Fast Ethernet Network Kit		
<b>DFE-908x</b>	(60558)	<b>\$379</b>
10/100Mb 8-port Stackable dual speed hub		

### D-Link DP-802 Internet and Print Server

D-Link DP802 Internet and Print Server easily connects to your LAN, the Internet, prints their Internet documents as well as other documents.

- Admin through Telnet or WEB Browser
- Share ISP Accounts
- 1x 10/100Mb LAN port, 1 RS232 WAN Port, 1 Parallel Printer port



Promo - see side bar

(79012) **\$649**

Also available: Print Servers/Routers/Modems

<b>DM-560</b>	(78986)	<b>\$189</b>
PC Card 56K Fax PCMCIA		
<b>DP-101</b>	(70076)	<b>\$259</b>
1 Parallel port 10Mb Multiprotocol Print Server		
<b>DP-602</b>	(59820)	<b>\$549</b>
Internet Server		
<b>DP-300</b>	(53598)	<b>\$450</b>
Dual Speed 10/100Mbps Multiprotocol Print Server 2 Parallel 1 Serial		
<b>DFM-5601</b>	(65473)	<b>\$142</b>
Internal 56K Voice/Data/Fax modem Rockwell Chipset		

For pricing and more detailed information on these and other D-Link products please refer to our Web Direct link or why not give us a call? Talk to our friendly helpful sales staff.

DP-802 Internet and Print Server for a limited time, receive a Lexmark BubbleJet 1100 Printer



# ServerLink™

Web  
Direct

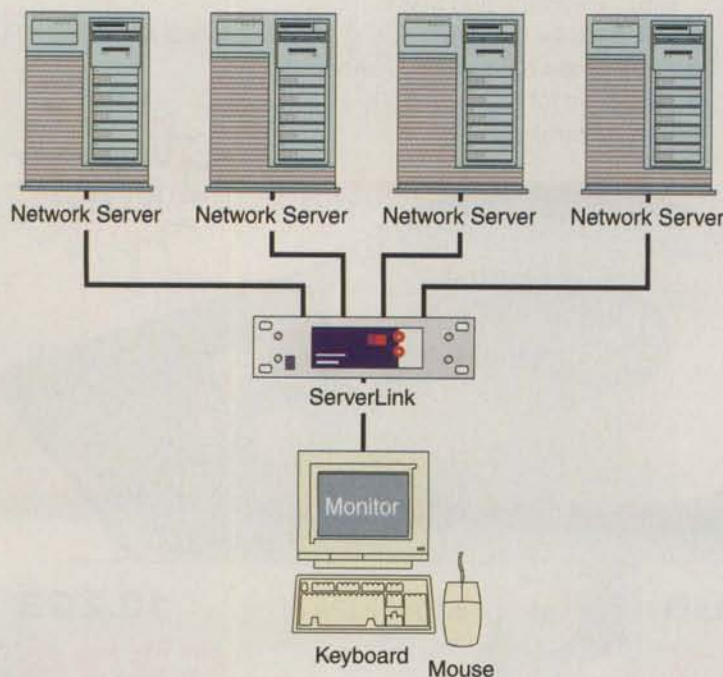
[www.ht.com.au/cat/serverlink](http://www.ht.com.au/cat/serverlink)

## Multi-Server Controller

### Control up to 256 network servers with a single monitor, keyboard & mouse

With a ServerLink you can monitor and fully control up to 256 network servers with just one monitor, keyboard and mouse. Save money on expensive monitors, create more working space and cut down on your power costs.

Designed and manufactured in Australia by an award winning engineering company, ServerLink is packed with features, providing total control of your ever expanding network.



- Select servers via On-Screen-Display
- Name servers for simple selection
- Mouse & keyboard emulation for flawless booting
- Scan Mode for periodic server monitoring
- Supports PS/2 and Serial mouse emulation
- Only one physical mouse required to operate both PS/2 and Serial Servers
- Backup power feature eliminates system power failure
- EPROM upgradable for future technology
- 8 and 16 port models 19 inch rack mounted design

• Available in 4, 8 and 16 port models

• 3 Year warranty

• Australian made



ServerLink™



Multi-Server Controller

From

**\$470**

(71652, 4-port)



Pop-up  
Screen  
Menu  
Control

# ServerLink™



ServerLink  
to  
computer  
cable

Each end of the cable fans out into three connectors.

2m cable for PS/2 mouse, keyboard and monitor (63972)

**\$17**

5m cable (63976)

**\$76**

2m cable for AT/Serial mouse, keyboard and monitor (63974)

**\$17**

5m cable (63977)

**\$75**



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## For all your Data Storage

# Hard Drive Upgrade Kits

Seagate TRAVAN Backup kits:



STT28000A-RFT  
4GB, internal IDE

(27274)

**\$475**

STT28000N-RFT  
4GB, internal SCSI

(56140)

**\$530**

STT220000A-RFT  
10GB, internal IDE

(76253)

**\$640**



Seagate DAT BackUp Drive:  
STD224000N/SB  
12/24GB SCSI  
DDS-2 Internal

(56150)

**\$2,137**



### What's in the Box?

5,400 - RPM MEDALIST drives bring multimedia performance and high capacities at an exceptional value.


- ◆ Seagate Ultra ATA Hard Drive
- ◆ Frame kit, mounting, brackets and drive screws
- ◆ Antistatic wrist strap
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- ◆ ATA transfer rates up to 66.6 Mb per second with Ultra ATA
- ◆ Seek times as fast as 11 msec
- ◆ Designed for Pentium PC's
- ◆ 3 Year Warranty




### Seagate Medalist IDE Value Disc Drives




 **ST34312A-R** **4.3GB**  
(79002) **\$252**

 **ST310232A-R** **10.2GB**  
(76893) **\$379**

 **ST36421A-R** **6.4GB**  
(79003) **\$298**

 **ST313032A-R** **13.2GB**  
(76896) **PRICE DROP \$399**

 **ST38422A-R** **8.4GB**  
(76890) **\$316**

 **ST317242A-R** **17.2GB**  
(76897) **\$496**





# All new acceleration for your PC!

## Stealth III S540

A New Era in Gaming Graphics

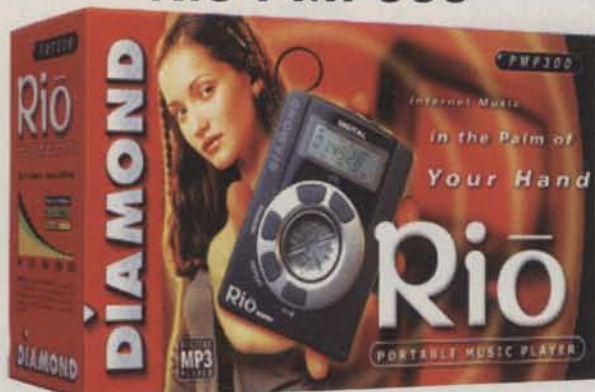
- \* Life-like 3D image quality featuring S3TC™ texture compression.
- \* Stunning video and hardware-accelerated DVD playback
- \* 32Mb high speed memory
- \* Most complete Direct 3D® and OpenGL® support - the industry gaming standards
- \* Fast game frame rates at over 60 frames per second
- \* Delivers extreme realism to hot new games like Unreal Tournament and Quake III
- \* High resolution gaming with 32-bit rendering to 1920x1440
- \* AGP 4x - compatible with all AGP slots including AGP 2x/1x



(79005)

**\$289**

## Rio PMP300



### Internet Music in the Palm of Your Hand!

The first portable MP3 music player that stores up to 60 minutes of digital-quality sound. Load the latest songs onto Rio directly from your hard drive, personal CDs or the Internet and carry them with you. It's smaller than an audio cassette and has no moving parts, so it never skips. Powered by a single AA battery, Rio provides up to 12 hours of continuous music playback.

- Lightweight: only 70 grams
- Palm size for easy portability
- 32MB built-in flash memory
- Expandable playback time with removable flash cards
- Skip free - no moving parts
- MusicMatch Jukebox Limited Edition software for converting CDs to an MP3 format
- CD Music Sampler



(70854)

**\$335**

## Viper V770



### Push the Limits of 2D and 3D Performance

- Viper takes three-dimensional effects for your gaming, entertainment, and business applications to revolutionary levels of performance
- Heart-stopping 3D gaming and revolutionary AGP 4X power
  - 32-bit colour and 32-bit Z/stencil for razor-sharp images
  - Rapid-fire 128-bit 2D acceleration with explosive colour
  - Extensive support for the latest games
  - Dual 32-bit colour 3D pipeline produces touchable 3D textures for realistic, fast-action gameplay
  - Powerful 128-bit acceleration for full-colour graphics and video with blazing speed and unsurpassed quality
  - 3D WinBench™ 99 (1024x768x32bpp) WinBench™ Mark 581
  - Full AGP 4x support
  - 32Mb SDRAM and 300MHz DAC for rapid-fire graphics display
  - Resolution support up to 2048x1536 and flicker free

(76759)

**\$364**

NEW



(16 and 32MB flash memory upgrade options available)



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## High performance CD-R/RW drives

# CD-R/RW Drive

RICOH **ATAPI** Internal CD-R/RW Drive MP7060A-WA (xxxxx)



RICOH

Media

CD-R  
Discs



(54770)

**\$4**

CD-R 5-pack  
(55092)

**\$18**

PRICE  
DROP

CD-RW  
DirectCD  
Formatted



4x

(74418)

Was

**\$38**

Now only

**\$17**

Write  
CD-R  
**x6**

Rewrite  
CD-RW  
**x4**

Read  
**x24**

**\$729**

**NEW!**

*When every  
second counts...*



- Ricoh's MP7060 Series CD-R/RW drives feature: 1x, 2x, 4x and 6x CD-R recording speed, 1x, 2x and 4x CD-RW rewriting speed and up to 24x CD-ROM/CD-R/CD-RW disc reading speed
- Designed to achieve accurate reading of audio data for high-quality music reproduction
- Strong dust resistance for greater reliability
- Average access time 120msec
- Comes with Easy CD Creator, the professional-level mastering software, and DirectCD 2.5, the software that makes it easy to write files
- Disc At Once, Session At Once (requires additional software), Track At Once, PacketWrite
- Includes one CD-R disc and one DirectCD-formatted CD-RW disc
- 2MB buffer memory

**Available  
soon:**



**SCSI**

Internal CD-R/RW Drive  
MP7060S-WA

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**HARRIS  
TECHNOLOGY™**

Rent: Short or long term. Finance options available: IBM Easylease, AGC.



Cheques OK with 2 x valid ID  
or T/T. Call for details.



# Verbatim

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## CD-R/CD-RW: Storage for life

Smart and  
Friendly

### CD Racer



#### Double Speed CD-Recorder with CD-RW ReWritability

CD-R/CD-RW. Enhanced IDE. 2x Write, 2x ReWrite, 24x Read.

Disc-at-Once, Session-at-Once, Track-at-Once, Multisession. Included: Adaptec Easy CD Creator Standard Edition, Smart and Friendly CD Consultant, Diamond Cut enhanced/CDR, ECI Disc Inspector Pro.

2MB buffer. Compatible with Windows 95/98, NT 4.0.



Internal IDE: (77816)

**\$495**

**NEW!**

### SpeedWriter Plus

Second generation of the award  
winning CD SpeedWriter.

Ideal for music and audio storage, data  
archiving and backup, disaster recovery  
and digital imaging.



External SCSI: (78955)

**\$899**

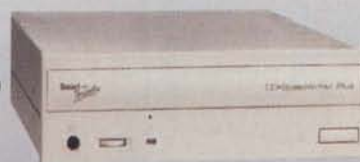
CD-R/CD-RW. 4x Write, 2x ReWrite, 24x Playback with a  
plentiful 2MB buffer.

Can create a full 650MB CD in as little as 17 min.

Included: Adaptec Easy CD Creator Standard, PowerQuest  
Drive Image, Diamond Cut Enhance/CDR, Sonic Foundry  
CD Architect, Sonic Foundry Sound Forge XP, MediaPath  
MediaAgent, ECI Disc Inspector Pro, Smart and Friendly  
CD Consultant.

Internal IDE: (78954)

**\$529**



**NEW  
PRODUCT**

### Verbatim Internet Mouse



-Scroll button  
and side button  
features.

-Browse the  
Internet or  
documents  
without moving  
the mouse.

-Supports Office  
97 and Internet  
Explorer with  
new zoom,  
scroll and Auto  
scrolling  
functions.

-PS-2 connector  
and serial port  
adapter.

-MS-DOS 3.3,  
Win3.1/3.11, '95  
& NT compatible  
(77817)

**\$30**

### Verbatim 2-button Deluxe Mouse



Serial port.  
DOS, Windows,  
Windows 95 &  
NT compatible.  
Ergonomic  
design. Smooth  
movement.  
(77818)

**\$15**



### CD-RW

DataLifePlus®  
ReWritable blank  
disc. Extra durable  
printable surface.  
2x/4x speed.  
650MB.

(77492) **\$15**



### CD-R

DataLifePlus® Writable  
blank disc. Extra  
durable printable  
surface. 74 Min.  
650MB.

(74740) **\$4**  
(76731) 10-pk **\$29**

### 20x PCMCIA Portable CD-ROM Drive

The low profile slim-line tray design of this external CD-ROM  
drive makes it ideal for mobile applications. Its built in PCMCIA  
interface allows any Windows based laptop or notebook to

access large  
volumes of  
CD-ROM data  
with ease.



Verbatim  
(77820) **\$290**

### Computer Headset with Microphone

- Vertical in-ear stereo headphone with  
adjustable microphone boom
- Ideal for notebook computer users



- Designed for  
MultiMedia  
convenience
- Lightweight and compact
- Adjustable headband
- Must be powered by a  
soundcard

(77819) **\$14**



**\$15**

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# DVD & Storage solutions for everyone



Only the finest manufacturers have been selected for these premium quality products. Designed with the ultimate hardware and software for trouble free performance, the DVD and Storage Solutions are simple to install and easy to use.



## Media



### Princo Blank CD-R

74 minutes

(74357)

**\$3**



### Princo Blank CD-R

80 minutes  
for full audio  
duplication

(73157)

**\$4**



### Princo Blank CD-RW

74 minutes  
rewritable

(74397)

**\$15**

## PRO-KIT

### Network CD Tower

- 8x 40x CD-ROMs installed
- 10/100Mbps network connection (auto sensing)
- Supports all major network protocols
- 2 cooling fans installed
- Easy to install
- No software needed

Access 8 CD's  
across a network



- *It's Powerful* – Pentium Class CPU, micro kernel, real time OS and PCI bus-mastering technology
- *It's Independent* – No attendant PC required
- *It's Internet Ready* – Built in WWW server function
- *It's Versatile* – Place it anywhere on the network
- *It's Upgradeable* – User upgradeable RAM using 72-pin EDO RAM

(79006) **\$3,399**

## PRO-KIT

### SCSI 8x20 CDR Kit

- Internal Panasonic Drive
- AdvanSys PCI SCSI Controller card
- Adaptec Easy CD Creator Software
- 2 blank media
- Audio and data cables
- Quick Installation Guide

**NEW**

#### EXTERNAL KIT ONLY:

- Sturdy self-contained external enclosure for recording stability

Internal Kit:  
(79007)

**\$698**

External Kit:  
(79008)

**\$855**

20x Read  
8x Write!!



## HITACHI

### DVD RAM

#### FOR MASSIVE DATA STORAGE

DVD RAM gives you massive storage capabilities. Great for storing large amounts of documents, images and archiving records. Hitachi are the leaders in DVD RAM.

- Internal SCSI DVD drive
- Massive data storage: 5.2GB per media, re-writable
- Backwards compatible
- Reliable storage method
- Includes 1 blank DVD RAM media
- Includes archiving software



(58069)

**\$1,242**



### MAXELL DVD RAM MEDIA

- 5.2GB double sided DVD RAM media
- Re-writable up to 100,000+ times

(75383)

**\$134**

## PRO-KIT

### Hardware Decoder

#### FOR UPGRADING PC'S

- Pioneer DVD-ROM Drive (32x CD-ROM)
- Microsoft Encarta 99 DVD Reference Suite
- PCI MPEG-II decoder card
- Audio and data cables
- Quick Installation Guide

**NEW**

(79009)

**\$565**



Now  
with MS  
Encarta 99  
DVD !!



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## The Future Is On Our Minds



### SONY® Trinitron Monitors

Breakthrough technology,  
unsurpassed in sharpness, clarity  
and colour definition

The super-fine-pitch aperture grille presents distinctively sharp and clear images with crisply rendered detail. The all-vertical structure results in bright, vibrant colours. Trinitron CRT's are vertically flat - straight lines always appear straight from any angle and from corner to corner.



**PRICE  
DROP!**

Sony Trinitron® CRT	100ES	200ES	200GS	400PS	500PS
Size	15"	17"	17"	19"	21"
Max. Resolution	1280x1024 @60Hz	1280x1024 @60Hz	1600x1200 @60Hz	1600x1200 @ 75Hz	1600x1200 @85Hz
Our part number	(66055)	(58205)	(58798)	(57451)	(58544)
Price	<b>\$499</b>	<b>\$849</b>	<b>\$1,099</b>	<b>\$1,710</b>	<b>\$2,798</b>

Digital Mavica  
MVC-FD91

### 3.5" Floppy Disk Digital Cameras Not just photos, but movies stored on a Floppy Disk!!

Digital Mavica  
MVC-FD83



(70203)

**\$2,538**

This SLR Style camera records up to 40 XGA (1024x768) or VGA (640x480) resolution still photos. PLUS, you can also record up to 60 seconds of full-motion video, all on a standard 3.5" Floppy Disk!! Packed with features including 14x Optical Zoom, Steady shot, InfoLithium™ rechargeable battery and charger, and bundled with MGI Photosuite™ to enhance that perfect photo!

The MVCFD83 records still shots at the same high resolution as the MVC-FD91, with up to 60 seconds of full-motion video straight on to a Floppy. Features a 3x Optical, 6x Digital Zoom, Auto Focus, 4 Digital Picture Effects, built-in auto intelligent flash, self timer (10 secs) and patented Sony InfoLithium™ rechargeable battery and charger.



(76801)

**\$1,740**

SONY



#### Speakers

SONY SRS-PC51

Pair of monitor mountable speakers. Looks good weather mounted on the side of your monitor or placed on the desktop. Crisp rich bass is guaranteed. Total output power 50W.

(76624)

**\$140**



#### Speakers

SONY SRS-PC300D

Provides big sound matched by rich resonant bass. A dynamic 3 piece system offering total output power of 300W PMPO. Two Audio inputs, mixing function and headphone jack.

(30906)

**\$199**

When only the best in Multimedia quality sound is what you want for your PC!



#### Speakers

SONY SRS-PC45

These desktop speakers include intelligent Bass boost feature, sound mixing and "surround sound" switch. Offers total output power of 100W.

(71991)

**\$152**



#### DAT Tapes

4mm x 90M  
2GB

**\$11**

(06103)

4mm x 120M  
4GB

**\$25**

(13262)

Tapes are also available as 5 packs

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2GB. 5-pk

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(54085)

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(24968)

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(30936)

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# matrox

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[www.ht.com.au/cat/matrox](http://www.ht.com.au/cat/matrox)

## NEW G400 Graphics Accelerators

**DRAMATICALLY DIFFERENT High Performance Graphics**

For information on this product and any others here, please refer to our Web Direct. Also pricing can change before we go to print, so keep up to date on our Web Site.



G400 Dual Head 32Mb RAM

(78103) **\$419**

The G400 series is the next generation of graphics acceleration cards from Matrox. The G400 enables Matrox to offer superb games performance as well as the speed, image quality and multimedia ability that has made Matrox the choice of demanding PC users. The G400 is an extremely fast graphics accelerator with the MAX version in the series offering even faster performance and a 360 Mhz DAC for ultra crisp display at high resolutions.

### G400 - Extreme Speed Plus:

- Environment mapped bump mapping - a sensational 3D feature. Only card to support this!
- G400 DualHead models runs x2 monitors from the one G400 card. Amazing! Look at [www.matrox.com/g400/applications/dual/home.htm](http://www.matrox.com/g400/applications/dual/home.htm) for many interesting uses.
- The G400 has stunning on screen visual quality
- Offers excellent DVD and TV out ability
- Upgradable to video capture & video editing (TV, VCR, PC Output)

G400 Dual Head 16Mb RAM

(78105) **\$329**

G400 Max Dual Head 32Mb RAM

(78106) **\$489**



For the latest info & pricing see this Weblink address!

Web  
Direct

[www.ht.com.au/cat/qudos](http://www.ht.com.au/cat/qudos)

QUDOS

## ISO 9001/2 Quality Systems

Essential Business Forms for Word Over 120 Useful Business forms for great use in Word 97 or Word 2000. See Web Direct for more information on this product.

(78994)

**\$17**

### TQA Series 5 - To develop your quality system!



#### Key Benefits

- ✓ Low price - only a fraction of consultants fees!
- ✓ Covers all relevant clauses of ISO 9001/2
- ✓ Works with your familiar word-processor
- ✓ Can be used by ANY size or type of business
- ✓ Allows development at your own pace

**Finalist 1997 and 1998 - Channel 9 TV "Business Software of the Year"**

(75554) TQA Series 5 CD

**\$338**

### Quality Manager - To manage your System



**DOCUMENT & DATA CONTROL** Master List To track important documents and data. Displays number, title, version & issue date. Links to leading Windows word processors to view documents. With network licence, documents may be distributed electronically.

#### INTERNAL QUALITY AUDITS

Audit Schedule to plan your audit program, and identify outstanding audits. Generate Audit Reports online. Duplicate Schedule reproduces

checklists and other details for future years. List Internal Auditors, their contact details, and audits planned / completed. Includes Query facilities.

#### NONCONFORMANCES / CORRECTIVE ACTION

Nonconformance List displays summary and outline of all reported nonconformances. Generate Nonconformance Reports online. Includes various Query facilities.

#### MANAGEMENT REVIEW

Record Minutes of Meetings. Default agenda and facility to create custom agenda.

(75559) TQA Quality Manager CD

**\$429**

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**HARRIS  
TECHNOLOGY™**

Rent: Short or long term. Finance options available: IBM Easylease, AGC.



Cheques OK with 2 x valid ID or T/T. Call for details.



# Video Multimedia

## Life TV USB



Australia's first external USB TV Tuner for Desktop and Notebook PCs.

- USB interface for easy installation
- Built in tuner modules

- supporting all Australian TV channels (CBD, country etc.)
- Capture from any external video device (VCR, Camcorder etc.) via composite and S-Video
- Capture full motion up to 30fps at 352 x 288 (640 x 480 on high performance systems)
- Supports hardware & software snapshot up to 640 x 480
- Twain driver for direct snapshot to most popular picture editing programs
- Video Conferencing compliant

(79016)

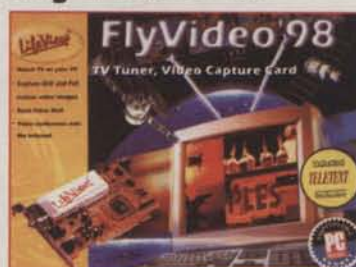
**\$295**

## TV Tuners

Turn your Desktop or Notebook PC into a Television, Video capture and Editing studio, or Video Conference with your family and friends. You can create live video and e-mail them to friends and family across the world, or compose your own photo albums all on your PC.



## FlyVideo 98



Multifunction TV Card that turns your PC into a TV station. Includes Video Mail, IE4, Greeting Card and Teletext.

- Easy to install PCI Plug-n-Play Card
- Built-in TV Tuner supports up to 125 channels, local and country
- Capture from any external device (VCR, Camcorder etc.) up to 25/30fps at 768 x 576 via Composite or S-Video connection
- Display and single frame capture resolution up to 1600 x 1200
- Video Conferencing compliant

(73828)

**\$149**

## CapView

CapView USB Video Conferencing, Video Capture, Video Editing & VideoMail solution. Works with any Camcorder, VCR for video input. The Software provided allows you to record/edit and e-mail video and audio messages, compile and create greeting cards. Features: Capture up to 30 fps in CIF format (352 x 288 Pixels). Supports hardware & software snapshot up to 640 x 480. Scalable video window size from 80 x 60 up to 640 x 480. Supports TWAIN interface for image editing applications. Ulead Video Studio 3.0 worth \$199.



(75943)

**\$139**

## Video Office

World's first Real-Time Software MPEG 1 Encoder. The VideoOffice conferencing kit, which includes Camera and Capture Card (PCI or PCMCIA) allows desktop users and notebook road warriors to create video contents for presentations, personal or business web-sites, and video CD's without expensive hardware. Features:

- Produces industry standard MPEG1 video and audio
- Compatible with all existing video editing and conferencing software
- Converts any AVI clips to MPEG1 formats
- Composite and S-Video Inputs
- Resolution: motion video up to 320 x 240 (NTSC or PAL)
- Resolution: stills up to 640 x 480 (NTSC) or 768 x 576 (PAL)
- Video Frame rate: up to 30 fps (NTSC) or 25 fps (PAL)
- Ulead Media Studio Pro 2.55



For Desktops (75945)

**\$639**



For Notebooks (75946)

**\$699**

## RoboCam USB



(75942)

**\$180**

The latest in high-resolution cameras, USB RoboCam, allows users to Video conference or capture in full motion or single frame snap shots.

Features: Captures up to 30 fps (352 x 288 Pixels) full motion video. Supports hardware and software snapshots up to 640 x 480. Supports TWAIN interface for image editing applications. Ulead Video Studio 3.0 worth \$199.



# Canon

For "live" pricing and more Canon products look here ↗

**Web  
Direct**

[www.ht.com.au/cat/canon](http://www.ht.com.au/cat/canon)

## You *can* on a Canon, can do!

**BJC-7100**



8ppm mono.  
1200x620dpi  
(72294)

**\$499**

**BJC-265SP**



4ppm mono.  
720x360dpi  
capable.  
Banner printing.  
(76009)

**\$157**

**BJC-4310 SP**



720x360dpi,  
4.5ppm mono  
(68730)

**\$198**

**BJC-50**



Portable.  
720x360dpi  
(63560)

**\$585**

**BJC-80**



Portable. 720dpi  
Optional scanning  
(52258)

**\$334**

**Canon**  
Colour  
Bubble Jet  
Printer



(xxxxx)

**\$549**

**HOT  
NEW PRODUCT**

**New Canon BJC-6000 combines speed, quality and cost savings**

If you print often in colour, you need a printer that is not only affordable, it has to be cost effective too. By having 4 separate ink cartridges, the BJC-6000 lowers your running costs since you change only the colours you use up.

- **High Speed.** 8ppm mono, 5ppm colour
- **High Quality.** At 1440 dpi, printouts appear crisp, with razor sharp images and silky smooth tonal gradation.
- **Photo Quality.** Six colour printing ensures photo quality.
- **Superior Cost Performance.** Separate ink tanks means that you only have to change the colour you use up.
- **Smart Ink Level Detection**
- **2 to 4 pages in 1 printing**
- **Stamping**
- **Accurate dot positioning**



Individual Ink Cartridge and replaceable print head saves money

**Canon**  
**BJC-5000**

Colour  
Bubble Jet  
Printer  
(20756)

**PRICE  
DROP**

**\$489**

- High resolution: 1440x720dpi
- Prints up to A3. Great for full bleed A4! Also prints banners.
- Print speed: mono HQ 7.5ppm, colour HQ 2.85ppm
- PhotoRealism
- Laser sharp black text
- Transparencies, high resolution paper, T-shirt transfers etc.

**A3 Capable**

**1440x720dpi**

**USB**

**Canon**  
**CanoScan**  
**FB 620U**

Colour Flatbed  
Scanner

(77674)

**\$365**

- USB Plug 'n Play convenience for Windows 98 equipped PCs
- Selectable resolution: 25 to 2400dpi
- True Optical resolution: 600dpi
- Comes with Omnipage LE OCR and photo imaging software

Also available: Parallel version FB 620P (68734)

**\$259**

Also available: SCSI version FB 620S (73885)

**\$399**

**USB**

**CanoScan FB 320U**

- USB for PCs with Windows 98
- Selectable resolution: 25 - 2400dpi
- Optical Resolution: 300 x 300dpi

(77673)

**\$280**

Also available: Parallel version FB 320P (68733)

**\$179**

**The workgroup  
workhorse.  
Fast, versatile,  
efficient.**

(63563)

**\$1,735**



**Canon LBP-1760 Laser Printer**

- Resolution: Up to 1200dpi
- Speed: Up to 17ppm
- Processor: Intel i80960HD 50MHz RISC
- Memory: 4MB; Memory Reduction Technology built-in
- Language: PCL 6 (PCL XL 5e emulation). (Adobe PostScript 3 optional)
- Paper input: 500-sheet cassette, 100-sheet multi-purpose tray (Pictured with optional extra 500-sheet cassette)

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**HARRIS  
TECHNOLOGY™**

Pricing\*\* and specifications herein are subject to change without notice



Cheques OK with 2 x valid ID  
or T/T. Call for details.



# Tektronix

For the latest info & pricing see this Weblink address!

Web  
Direct

[www.ht.com.au/cat/tektronix](http://www.ht.com.au/cat/tektronix)

## Business Laser Printing

### Phaser 840 Colour Laser Printer



#### Tired of 256 shades of grey?

Get the competitive advantage of colour without the slow speeds, high operating costs, and complex maintenance that come with most colour lasers. Now, there's a brand new alternative.

The Phaser 840 solid-ink laser printer. A winning combination of easy, cost-effective colour printing, quality, and colour print speeds over twice as fast as the typical colour laser! The Phaser 840 colour printer makes life simple and is remarkably cost effective for any workgroup with a colour job to do. Set up is breeze with its "plug-and-print" right-out-of-the-box design.

And.. **free black ink** means you can add colour to documents and still keep the same low cost-per-page as a monochrome laser printer. Colour is now affordable!



#### For Phaser

840:

Colour Ink Sticks (C,M or Y) 2-pack (71872, 71873, 71874)

**\$194**



Colour Ink Sticks (C,M or Y) 5-pack (71869, 71870, 71871)

**\$399**

Paper Tray (71905)

**\$234**

Transp. / Label Tray (71906)

**\$234**

16MB Memory (71844)

**\$439**

32MB Memory (71845)




**\$875**

64MB Memory (71846)

**\$1,746**

A4 Premium Transparencies 50 sh. (71902)

**\$139**

Model <b>Tektronix</b>	 840/N	 840/DP	 840/DX
Resolution	1000 dpi	1200 dpi	1200 dpi
Memory Standard/Max	32 MB (128 MB)	64 MB (128 MB)	128 MB (128 MB)
Built-in Hard Disk	Optional	Optional	2 GB Hard Disk
RISC PowerPC Image Processor	133 MHz	133 MHz	133 MHz
Max. Speed Fast Colour	10 ppm	10 ppm	10 ppm
Max. Speed Standard	6 ppm	6 ppm	6 ppm
Max. Speed Enhanced	3 ppm	3 ppm	3 ppm
Max. Speed High Resolution/Photo	-	2 ppm	2 ppm
Pipeline Printing	Optional	Standard	Standard
Job Accounting	50 Jobs	500 Jobs	5,000 Jobs
Check Print Preview	Optional	Optional	Standard
Remote Printing	Standard	Standard	Standard
PDF Direct Printing	Optional <sup>1</sup>	Standard <sup>1</sup>	Standard
Collation Printing	Optional <sup>1</sup>	Standard <sup>1</sup>	Standard
Duplex Built-in Automatic	Optional	Standard	Standard
Main Paper Tray 200-sheet	Standard	Standard	Standard
Hi-capacity Tray 500-sheet each (two)	Optional	Optional	Standard (one)
Part number	(71839)	(71840)	(71841)
Price	<b>\$5,899</b>	<b>\$7,285</b>	<b>\$9,890</b>

<sup>1</sup>Requires optional hard disk drive.

Call Harris Technology on 1300 13 9999 to ask about Tektronix **A3** colour lasers!

Great value from only **\$11,495** (23071)

**Sales 1300 13 9999**  
**Fax 1300 13 6666**

**Website [www.ht.com.au](http://www.ht.com.au)**  
**E-mail [sales@ht.com.au](mailto:sales@ht.com.au)**

**Ground floor**  
**275 Alfred St**  
**North Sydney**

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## EPSON Promotion



Purchase a Stylus colour 740 during August only\* and you will receive **FREE** a **HARRIS PACK**. Consists of: Starter pack of paper - 44 mixed specialty papers, 1 Colour and 1 Black ink, 1x2 yr Warranty upgrade, \$220 worth for **FREE**. Offer runs 01/08/99 to 31/08/99.



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# Makes bright ideas look brilliant



## EPSON STYLUS COLOR 900

The fastest A4 colour inkjet printer in its class

The fastest colour inkjet in its class at 12ppm - an amazing one page every five seconds. Ideal for the business environment. It also offers flexible connectivity solutions, including Universal Serial Bus (USB) for Windows 98.

- Up to 12ppm mono, up to 11.7ppmcolour
- Fully Network capable
- EPSON Ultra MicroDot™: world's smallest ink droplet
- High capacity black ink cartridge for volume printing
- 1440dpi print resolution, enhanced EPSON Variable-Sized Droplet Technology

(74351)

**\$779**



## EPSON STYLUS PHOTO 1200

The ultimate A3+ Photo Reproduction Quality colour printer

Perfect for graphic artists and professional photographers. Combines EPSON's 1440 dpi PerfectPicture Imaging System with a 6-colour QuickDry™ ink palette and A3+ (329 x 483mm) paper handling. This means you can now produce full bleed A3, Photo Reproduction Quality images complete with crop/registration marks.

- A3+ Photo Reproduction Quality printing
- 6 colour QuickDry™ inks, Variable-Sized Droplet Technology
- Parallel, USB serial interfaces, Win 95/98, NT 4.0 compatible

(74352)

**\$930**



## EPSON EPL-N1600 Laser Printer

Grows with your business

High class performance printing for workgroups or demanding stand-alone users, with options to provide freedom to upgrade as your business grows.

- 1200dpi with MicroGray 1200 and BiRITech, speed up to 16ppm
- 8Mb RAM, expandable to 40Mb.150Mhz processor.
- Up to 3 different paper sources - 1 x 250 sheet cassette, 1 x 80 sheet multi-purpose feeder and an optional 500 sheet cassette, offering 830 sheets total paper capacity.
- Optional network connectivity

(74388)

**\$1,995**



## EPSON GT-7000 Scanner

The scanner that allows you to scan at the touch of a button!

36-bit colour SCSI scanner with an optical resolution of 600 x 1200 dpi. It has a maximum output resolution of 9600 dpi and delivers more than 68 billion colours. With the optional Film Adapter, the GT-7000 can scan negatives and slides. The optional Automatic Document Feeder lets you scan single-sheet documents while the scanner is unattended. Software included: Xerox TextBridge Classic, Adobe PhotoDeluxe, Adobe PageMill, EPSON Personal Copy, EPSON Photo Sheet.

SCSI: (72234)

**\$410**

USB: (76834)

**\$410**





# HP Laser Printers

## HP LaserJet 1100 Printer

HP's JetPath technology allows you the flexibility to expand the HP LaserJet 1100 printer into an All-in-One performer when your business needs grow. Crisp, sharp 600dpi laser printing. 8ppm print speed. 2MB RAM.



(70095) **\$789**

## HP Toner Recycle Rewards

Stock up HP black toner cartridges before September 30 1999 and collect your HP Toner Recycle Rewards: HP Calculators, Scanners, DeskJet printers, even LaserJet printers! Call for details, and ask for a HP Recycle Rewards Registration & Claim Form.

## HP LaserJet 1100A Printer-Copier-Scanner

If your current business needs require the HP LaserJet 1100 with copying and scanning capabilities, move up to the LaserJet 1100A. Printing, copying and scanning: all-in-one. Make laser copies at the touch of a button, even without the PC turned on. Scan resolution 600dpi enhanced, 300dpi optical.

(70096) **\$925**

## HP LaserJet 2100 Series

### All models feature:

- 1200dpi resolution • 10ppm print speed • 60MHz processor • 350-sheet capacity • 15,000 page monthly duty cycle • Excellent performance



### HP LaserJet 2100

A fast flexible laser with room to grow.  
(EIO, PCL 6, 4MB RAM)

(72291)

**\$1,345**



### HP LaserJet 5000

16ppm,  
100MHz,  
1200dpi,  
4MB, prints  
up to A3.

From: **\$2,749** (60548)



### HP LaserJet 2100M

A fast flexible laser with PS and PCL.  
(EIO, PCL 6, 8MB RAM)

(72292)

**\$1,620**



### HP LaserJet 2100TN

A complete network printer.  
(EIO, PCL 6, 8MB RAM, additional 250-sheet feeder, HP JetDirect print server installed)

(72293)

**\$1,899**



### HP LaserJet 8000

24ppm,  
133MHz,  
1200dpi, 16MB,  
print/duplex up to A3.

From: **\$4,578** (60551)

## HP LaserJet 4050



More yes with less stress

- ✓ 2GB Hard Drive Option
- Enhanced productivity features (only available with Hard Drive): Private Printing, Quick Copy, Proof & hold function, Infra Red Port standard on all models, E-form solutions.
- ✓ Faster 133 Mhz processor
- ✓ Double the memory of the LaserJet 4000 series
- ✓ 1200 dpi at full engine speed (16ppm)
- ✓ 10/100 base TX JetDirect card on N & TN models

### 2GB Hard Drive for LJ4050

(71915)

**\$520**

Model:	4050	4050N	4050TN
Input capacity:	1x100, 1x500	1x100, 1x500	1x100, 2x250
RAM:	8MB	16MB	16MB
Network:	capable	ready	ready
Part number:	(77443)	(77445)	(77446)
Price:	<b>\$2,299</b>	<b>\$2,870</b>	<b>\$3,435</b>

## Colour



### HP 2000C Professional Series Colour InkJet

10ppm mono  
A4, 4ppm  
colour A4,  
600dpi,  
2MB RAM  
From (69484)

**\$1,345**



### HP 2500C Professional Series Colour InkJet

A3 capable!  
9ppm mono  
A4, 7ppm  
colour A4,  
1ppm colour  
A3, 600dpi,  
4MB RAM  
From (70725)

**\$2,097**



### HP Colour LaserJet 4500 Series

16ppm mono,  
4ppm colour,  
600dpi, 32MB  
RAM  
From (70356)

**\$5,343**





# HP DeskJet Printers

Order on-line and get  
even lower pricing!

HP Iron-on  
transfers  
10 sheets A4

**\$29**  
(52818)

HP Glossy  
greeting  
card paper  
10-pack

**\$18**  
(70192)

HP Premium  
paper  
200 sheets A4

**\$39**  
(19172)

HP Premium  
glossy paper  
50 sheets A4

**\$79**  
(24427)

HP Premium  
photo paper  
15 sheets A4

**\$18**  
(54010)

For more  
HP  
Media  
see the  
Web  
Direct  
Link

**HP DeskJet 695C**  
Easy to use - great quality  
Photo capable



(66260)

**\$258**

**HP DeskJet 710C**  
Do you dream in colour?



(68905)

**\$325**

**HP DeskJet 810C**  
Brilliant photo-quality results  
for a great price

**NEW!!**



(77961)

**\$392**

**HP DeskJet 880C**  
Super-fast, stunning print  
quality on plain paper



(72920)

**\$479**

**HP DeskJet 895Cxi**  
Networkable with optional  
JetDirect Print Server



(70705)

**\$788**

**HP DeskJet 1120C**  
Networkable All-rounder  
Prints A3 format

**New low  
price**



(56298)

**\$786**

HP DeskJet Family	695C	710C	810C	880C	895Cxi	1120C
Print Speed Black	5ppm	6.5ppm	6.5ppm	9ppm	11ppm	7ppm
Print Speed Colour	2.5ppm	4ppm	4.5ppm	6.5ppm	8.5ppm	5.5ppm
Resolution Black	600dpi	600dpi	600dpi	600dpi	600dpi	600dpi
Resolution Colour	600x300dpi	HP PhotoREt II	HP PhotoREt II	HP PhotoREt II	HP PhotoREt II	HP PhotoREt II
Monthly Volume	1000 pages	1000 pages	1000 pages	2000 pages	3000 pages	3000 pages
Input Capacity Std	100sheets	100sheets	100sheets	100sheets	100sheets	150 sheets
Envelope Input	20	15	15	15	15	15
Network Capable	no	no	no	no	yes	yes
Connectivity	Parallel	Parallel	Parallel & USB	Parallel & USB	Parallel & USB	Parallel
Media types	Plain & special paper, envelopes, transparencies, labels, card stock, banners, iron-ons, HP Premium paper	Plain & special paper, envelopes, transparencies, labels, cards, continuous-feed banners, iron-ons, HP Premium paper	Plain, InkJet, photo and glossy paper, envelopes, transparencies, labels, banners, index cards, custom	Plain, InkJet, photo and glossy paper, envelopes, transparencies, labels, banners, index cards, iron-ons, custom	Plain, InkJet and photo paper, envelopes, transparencies, labels, index cards, greeting cards, banners, iron-ons	Plain, special & photo paper, envelopes, transparencies, labels, greeting cards, postcards, banners, iron-ons, HP Premium paper

**Crisp black,  
vibrant colour**





# The HP "All-in-One" Series

## HP OfficeJet 635

- Colour printer
- Colour copier
- Colour scanner
- Mono fax

**PRICE  
DROP**



(55544)

**\$699**

## HP OfficeJet 725

- Colour printer
- Colour copier
- Colour scanner
- Colour fax

**NEW!**



(71269)

**\$899**

## HP LaserJet 3100

- Mono printer
- Mono copier
- Mono scanner
- Mono fax



(58566)

**\$1,449**

## HP OfficeJet R45

- Colour printer
- Colour copier
- Colour scanner

Improved image quality on all media types  
Faster  
Quieter  
Smaller design  
Banner printing



(xxxxx)

**NEW! \$1,499**

## HP OfficeJet R65

- Colour printer
- Colour copier
- Colour scanner

Improved image quality on all media types  
Faster  
Quieter  
Smaller design  
Banner printing



(xxxxx)

**NEW! \$1,899**



**BUY the  
new HP  
OfficeJet  
725 and  
receive a  
Photo  
Cartridge  
valued at  
\$75  
FREE!!**

More for  
your money!



HP All-in-one Family	OJ 635	OJ 725	LJ 3100	OJ R45	OJ R65
Print Speed Black	5ppm	5ppm	6ppm	11ppm	11ppm
Print Speed Colour	2ppm	2ppm	-	8.5ppm	8.5ppm
Print Resolution Black	600dpi	600dpi	600dpi	600dpi	600dpi
Print Resolution Colour	600x300dpi	600x300dpi	-	HP PhotoREt II	HP PhotoREt II
Fax/PC Fax Memory	150 pages	65 pages	150 pages	-	-
Fax Speed Dials	65	100	175	-	-
Maximum Copies	99	99	99	50	99
Copier Zoom	50-200%	25-400%	50-200%	25-400%	24-400%
Scan Resolution Enh.	1200dpi	1200dpi	600dpi	600x2400dpi	600x2400dpi
Scan Resolution Optical	300dpi	300dpi	300dpi	9600dpi	9600dpi
Scan Bit Depth	24-bit	24-bit	256 levels of grey	30-bit	30-bit
Paper Capacity	100 sheets	150 sheets	100 sheets	100 sheets	100 sheets
Auto Document Feeder	No	No	No	No	Yes
Software	Corel Print & PhotoHouse Limited, Edition, Caere OmniPage Limited	Adobe PhotoDeluxe Business Edition, Caere Omnipage Ltd	JetSuite Pro, ReadIRIS OCR	Adobe PhotoDeluxe Business Edition, OCR, KMT Office in Color	Adobe PhotoDeluxe Business Edition, OCR, KMT Office in Color





**HP ScanJet 6200C**

Network capable. With slide adapter. USB interface, SCSI capable.

**\$760**

(66184)



**HP ScanJet 4100C**

Easiest scanner for home. USB interface.

**PRICE DROP**

**\$249**

(67196)

**BUNDLES**

ScanJet 5200C  
+ OEM Adobe  
Photoshop 5.0

**\$916**

(75952)

ScanJet 6200C  
+ OEM Adobe  
Photoshop 5.0

**\$1,324**

(71635)

ScanJet 6250C  
+ OEM Adobe  
Photoshop 5.0

**\$1,497**

(71636)

ScanJet 6250C  
+ Omnipage  
Pro 9.0

**\$1,210**

(70707)

# Smart Scanners! Sharp Results!

## HP ScanJet 3200C

### Best value for home

- Easy software guides you to quick success
- Versatile and easy setup with parallel port
- Form a trusted brand, backed by HP Customer Care
- Great price



(74116)

**\$185**

## HP ScanJet 4200C

### Most versatile for the enthusiast

- 3-button convenience for scan, copy and email projects
- Store and manage photos effortlessly with powerful photo software
- Easy to set up and fast operation with USB.

**USB  
INTERFACE**



(74117)

**PRICE DROP**  
**\$299**

## HP ScanJet 5200C

### Highest productivity for business

- Get your complete scan job done up to three times faster
- Internet-ready files automatically
- Complete software solution for businesses
- Easy setup through USB or Parallel

**USB &  
PARALLEL**



(74118)

**\$464**

## HP ScanJet 6250C

### Best image quality for the professional

- A powerful networkable scanner
- Image customisation controls
- Best optics and digital processing for best images
- Automatic document feeder
- 35mm slide scanning
- USB interface, SCSI capable

**USB  
& SCSI Capable**



(66185)

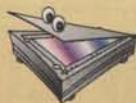
**\$940**

HP ScanJet Family	3200C	4100C	4200C	5200C	6200C	6250C
Resolution optical	600dpi	600dpiHSS	600dpi	600dpi	600dpi	600dpi
Resolution enhanced	9600dpi	1200dpi	9600dpi	9600dpi	999.999dpi	999.999dpi
Bit depth	30bit	36bit	36bit	36bit	36bit	36bit
Interface	Parallel	USB	USB	Parallel USB	USB SCSI capable	USB SCSI capable
35mm slide scanning	No	No	No	Optional	Yes	Yes
Auto Document Feeder	No	No	No	Optional	No	Yes
Bonus Software	PrecisionScan LT, Adobe Photo- Deluxe 2.0	PrecisionScan LT, ScanJet Copy Utility, Adobe PhotoDeluxe 2.0	PrecisionScan LT, ScanJet Copy Utility, Adobe PhotoDeluxe 3.0, G&A Imaging PhotoRecall Deluxe Photo- management soft- ware, Scantastic	PrecisionScan 2.0 ScanJet Copy Utility, Adobe PhotoDeluxe Business Edition, Caere Page- Keeper Standard, Online email & Web task software	PrecisionScan Pro, Precision Scan LAN, Scan- Jet CopyUtility, Adobe Photo- Deluxe Business, Caere PageKeeper Std, FaxSav Fax- Launcher Pro, HP Intelligent Assistant	PrecisionScan Pro, Precision Scan LAN, Scan- Jet CopyUtility, Adobe Photo- Deluxe Business, Caere PageKeeper Std, FaxSav Fax- Launcher Pro, HP Intelligent Assistant

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# Software Solutions for Scanners



## The four best scanner solutions in one box →

- ✓ **Most Accurate OCR**
- ✓ **Leading Photo Editing**
- ✓ **Automatic File and Find**
- ✓ **#1 Annotation Software**

Upgrade from any OCR (79082)

\$626 worth for only

# \$323

Full version: (79079) **\$1,154**

**A must for  
every scanner  
owner!**

# 1

### Caere OmniPage Pro 9.0

#### The most accurate OCR

It's the world's leading OCR software with over 99% accuracy\*

- Easy, one-button OCR
- Automatic proofreader
- Retains your original page layout
- Superior integration with Microsoft® Word
- \* On laser quality documents using standard fonts



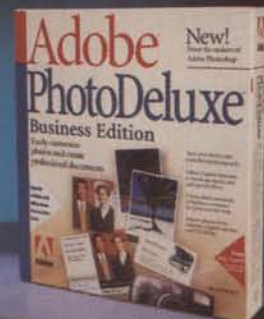
# 2

### Adobe PhotoDeluxe Business Edition

#### Popular image editor

Easily customize photos and create professional documents.

- Hundreds of templates to get you started
- Touch up, repair, add special effects
- Great for printing or the Web
- Access to clip art, typefaces and more through the Web



# 3

### Caere PageKeeper Pro3.0

#### The best document manager

Easily file and find scanned documents, word files and more

- Fully automates the time-consuming tasks of organizing & maintaining your documents.
- Works like a search engine, instantly finds any document
- Supports any file format
- Automatically keeps track of edits



# 4

### Post-It®

#### Top annotation software

Now have the convenience of Post-it notes on your PC!

- Quick, easy way to organize and communicate ideas without interrupting your work
- Add notes to scanned images, documents, even on your desktop
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# Making images work for you

More from Agfa

Transparency Adapter for SnapScan 1236s. Max. scanning area 203x254mm. (76779)

**\$399**

Automatic Document Feeder for DuoScan T1200. (75581)

**\$458**

Softcase for ePhoto 1280. (75606)

**\$33**

Cable set for ePhoto 1280/780/1680. (75603)

**\$46**

8MB Memory option for ePhoto 1280. (54719)

**\$192**

ePhotoAC Adapter & case (75337)

**\$118**

Have a look at the Harris Technology Web Site [www.ht.com.au](http://www.ht.com.au), not only for Agfa products, but also for the latest pricing and information on 33,000+ other computer products!

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## SnapScan 1212p

One pass, high quality 600x1200ppi scanner with parallel interface. 36-bit colour. Includes Omnipage LE OCR, Paperport, iPhoto Express, and FotoLook software. Compact design. Great value for money! Compatible with Win95/98/NT.

(74495)

**\$249**


## SnapScan 1212u

New translucent green version. One pass, high quality 600x1200ppi scanner (9600ppi max) with USB interface. Includes Caere Omnipage LE OCR, Caere PageKeeper, Corel PrintHouse Magic Select & Agfa's incredible ScanWise software. Compatible with Win98 & USB Technology.

**NEW PRODUCT**

(74496)

**\$265**


## SnapScan 1236s

One pass, high quality 600x1200ppi scanner (9600ppi max.) with SCSI-2 interface. 36 bit colour. Includes Omnipage LE OCR, PaperPort, iPhoto Express, Color-It, and FotoLook software. Compatible with Win3.x/Win95/98/NT.

(74497)

**\$385**


## DuoScan T1200

TwinPlate™ flatbed scanner with built in transparency scanning SCSI-2 interface. Optical resolution 600x1200ppi, 36 bit. Includes Omnipage LE OCR, PaperPort, Agfa's FotoLook, ColorTune, Caere OCR Software, Corel PhotoPaint 8. Document feeder also available.

(74498)

**\$1,315**


## ePhoto CL50

Digital camera with built-in microphone for adding up to 10 seconds of voice or sound per image. Resolution 1600x1200 pixels. 3x optical, 2x digital zoom. Optical viewfinder and 2" LCD screen. Burst mode: hold shutter for continuous shots. Up to 96 photos on the included 8MB card.

**NEW PRODUCT**

(76793)

**\$1,760**


## ePhoto 1680

Digital camera with swivel zoom lens for those hard-to-get photos. Resolution up to 1600x1200 pixels for photo-quality prints. 3x optical zoom, 2x digital zoom. 2" LCD screen. 5 and 10 second self-timer. Up to 48 photos on the included card. 4 flash settings. Ability to save camera settings.

(72300)

**\$1,760**


## ePhoto 780

Digital camera that doesn't let you wait between shots! Four image quality options. View your pictures on a tv. Resolution up to 1024x768 pixels with Agfa PhotoGenie Technology for outstanding prints without jagged edges. 1.8" LCD screen. Up to 96 photos on the included card. Self-timer. 4 flash settings.

(70188)

**\$699**


## ePhoto 1280

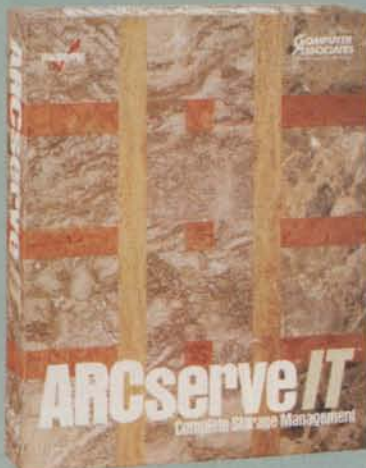
Digital camera with swivel zoom lens that lets you take pictures from any angle. View your pictures on a tv. Five image quality options. Resolution up to 1280x960. 3x optical zoom, 2x digital zoom. 2" LCD screen. 5 and 10 sec. self-timer. Up to 60 photos on the included card. 4 flash settings.

(54680)

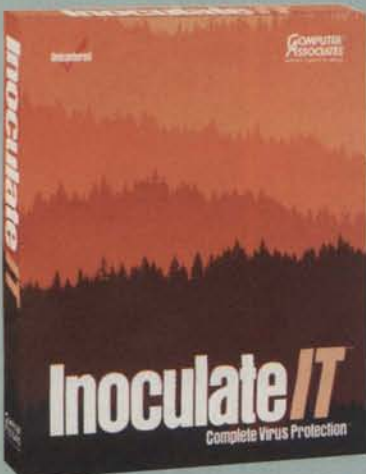
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## Go For **IT**- Management software



### Complete Storage Management



### Complete Virus Protection

## Go For **IT**

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ARCserveIT protects your most critical business asset...data. This world-leader in backup/restore technology delivers record-breaking performance, easy administration and unsurpassed reliability. An extensive suite of options offer additional client/server support, enhanced performance and automation, online backup of business applications and fast disaster recovery.

#### ARCserveIT 6.61 Win NT Workgroup Edition

Installs on a single Windows NT server .250 Clients included.

(76730) **\$728**

#### ARCserveIT 6.61 Win NT Advanced Edition

To backup multiple Windows NT servers with centralised management. Unlimited clients included.

(77154) **\$1447**

#### ARCserveIT 6.61 Win NT Workgroup/Advanced Edition Disaster Recovery Option

(77681) **\$527**

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### INOCULATE/IT 4.53 WIN NT

InoculateIT is the premier antivirus solution for networked environments offering unmatched management and virus protection. Exclusive features of InoculateIT include Real-Time Cure, Universal Manager, Virus Wall, Virus Quarantine, Hands-Free Updates, Extensive Alerting Options, Internet Web Browser Integration and Messaging Protection. InoculateIT is certified by the International Computer Security Association (ICSA) to detect 100% of viruses "in the wild" and ensures your network is protected against potentially damaging and costly virus incidents. InoculateIT is fully integrated with AntiVirus clients for all major desktop systems.

#### InoculateIT 4.53 Win NT Workgroup Edition

Installs on a Win NT Server.

(76149) **\$519**

#### InoculateIT 4.53 Win NT Advanced Edition

Provides centralised management. Installs on each server.

(77969) **\$729**

#### InoculateIT 4.53 Workgroup/Advanced Edition

1 User Client	(76151)	<b>\$59</b>
10 User Clients	(76152)	<b>\$425</b>
25 User Clients	(76153)	<b>\$649</b>
100 User Clients	(76154)	<b>\$2110</b>
250 User Clients	(76155)	<b>\$4390</b>



# PC Security & Management

## MCAfee VirusScan



Deluxe Version (70215)

**\$82**

### #1 in Virus Detection and Removal. Stop viruses before they stop you!

Keeps your system clean, mean and virus-free. Using only the latest technology, VirusScan detects 100% of viruses including floppy disks, Internet downloads, e-mail attachments, Intranets, shared files, CD-ROM and online services (even inside the most popular compressed file types).

- Scan for viruses
- Schedule automatic system scans
- Receive virus detection updates
- Access additional protection tools



Classic Version (70216)

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## MCAfee 2000 Toolbox



### 2000 Toolbox is more than a millennium product. It's what you need for superior performance TODAY.

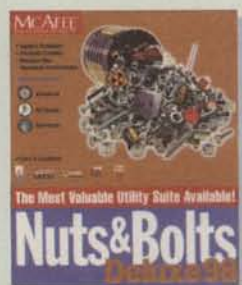
Checks Time Clock Hardware, BIOS & fixes problems. Scans data files (incl. Excel, Access and others) for potential date problems. Scans for and fixes 2 year date fields in data files. Checks and optimizes Windows settings for operation beyond 2000.

**McAfee 2000 Toolbox gives you overall PC protection, right now:** Virus protection, backs up critical system regions and helps get your system up and running in case of a disaster, monitors your system, alerts you to potential problems etc.



**\$49** (65252)

## MCAfee Nuts & Bolts Deluxe 98



(65253)

**\$95**

Optimises, monitors and analyses system & software to maximise performance.

Features the following packages:

- Nuts & Bolts
- VirusScan
- WebScanX
- PGP
- Hurricane
- Year 2000 fix
- Discover professional
- Disk Minder
- Disk Tune
- Bomb Shelter
- Registry Wizard

## MCAfee First Aid Deluxe 2000



(76042)

**\$98**

If you've ever had a problem with your PC, you need First Aid!

**Examines and Heals Your Computer.**

It will examine the entire PC, (including your Internet setup), and solve problems concerning: Crashes, Software Conflicts, e-mail, Web Connection, Hardware Conflicts, Disk Failure, Multimedia, Printer Setup. New features: Universal Undo- make changes to your computer or settings without worrying about mishaps! Year 2000 Fix. Clears Internet junk files and temp files. Virus alert and detection.

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Window to the Future

Watch this space for McAfee Office 2.0 and McAfee Uninstaller 5.0

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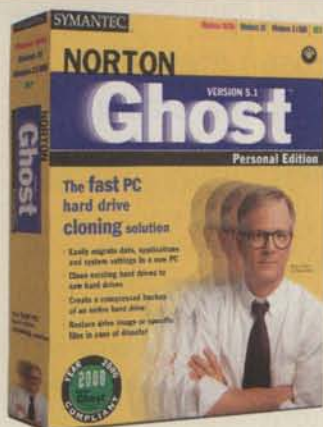
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## Software the way you want it



### Norton Ghost now available in Personal Edition

(78908)

**\$129**

Norton Ghost Personal Edition 5.1 speeds up and simplifies PC system migration, hardware upgrade, disk backup and disaster recovery operations for technically savvy home computer enthusiasts.

#### Features:

- Easily migrate data, applications and system settings to a new PC
- Clone existing hard drives to new hard drives
- Create a compressed backup of an entire hard drive
- Restore drive image or specific files in case of disaster



### New version: Symantec pcAnywhere 9.0

(78910)

**\$227**

The #1 seller for fast, easy access to any PC. If you need to work from home or on the road, pcAnywhere lets you connect to your office PC to retrieve files or run desktop applications. pcAnywhere lets IT professionals remotely support users and manage servers effectively.

**New features include:** easily connect to others over the Internet from within Yahoo! Pager software, launch 3rd party applications during a pcAnywhere session, never send more colours than the remote computer can handle, improved explorer-like file transfer user interface, better security and much more.



### Norton SystemWorks 2.0

(76211)

**\$179**

**5 powerful utilities  
to fix and prevent  
PC problems**

Norton SystemWorks™ is the first fully integrated, comprehensive utility suite, comprised of five award-winning Symantec products that work together to both fix and prevent system problems:

- Norton AntiVirus™ 5.0
- Norton Utilities™ 4.0
- Norton CleanSweep™ 4.5
- Norton CrashGuard™ 4.0
- Norton Web Services™

#### The Bonus Pack includes:

- ZipIt™
- Visual Page™
- WinFax™ Basic Edition
- Norton 2000™ to make your PC and data millennium ready

**Includes  
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PACK  
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\$500**



### Norton Utilities 4.0

(75321)

**\$142**

Optimises your computer for running at peak efficiency. Works in the background to detect Windows problems and provides intelligent repair. Prevents crashes and screen freezes. Fix Internet connection problems.



### Norton AntiVirus Gold 5.0

(67197)

**\$85**

The #1 Anti-virus software in the world. Keeps your computer safe from viruses that might come in from e-mail attachments, floppy's, Internet downloads, software CD's or a network. Retrieve new anti-virus definitions from Symantec.



### Symantec WinFax Pro 9.0

(67201)

**\$127**

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### Norton CleanSweep 4.5

(74072)

**\$59**

Recover hard drive space! Removes unneeded items, even gets rid of extraneous cookies, ActiveX controls, downloaded programs and other Internet files, while protecting vital programs, files and Windows settings.



### Norton CrashGuard 4.0

(72830)

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### Symantec ACT! 4.0

(58206)

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### Symantec TalkWorks Pro 2.0

(67203)

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## Microsoft Press - Work Smarter

### Microsoft Office 2000 Resource Kit



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(74212)

**\$70**

### Microsoft Press Running Office 2000 Professional



Running Microsoft Office 2000 professional is a reference/tutorial that takes readers through the Professional package: Microsoft Excel, Word, PowerPoint®, Access, Outlook™, and Internet Explorer. The series is designed to be easy-to-use, with a friendly, open design, featuring copious screen shots, call-outs, cross-references, and tips.

(74222)

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### Microsoft Press Excel 2000 At a Glance



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(74183)

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Running FrontPage 2000	(74172)	<b>\$55</b>

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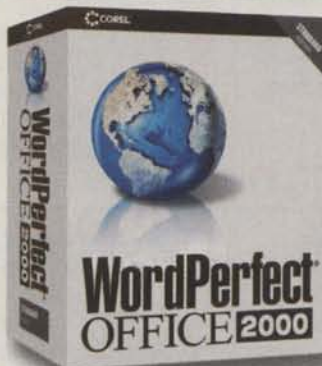
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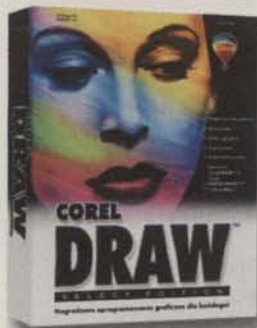
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Discover an office suite that works YOUR way: WordPerfect Office 2000. Ideal for home and business, it offers powerful software for word processing, spreadsheets, and presentations. Share files across most major programs and publish to the Web from the core applications.

Includes the following main applications:

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## CorelDRAW® Select Edition

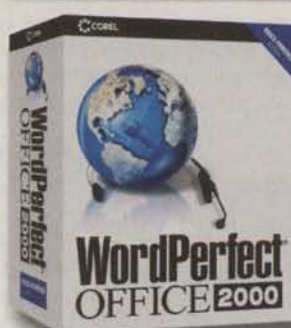
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WordPerfect  
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- ★ Roll-feed and automatic cutter standard
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- ★ Adobe Photoshop 5.0
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(79130)

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\*Legs optional

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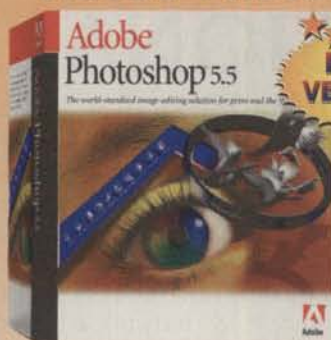
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The world standard image-editing solution for print and the Web.

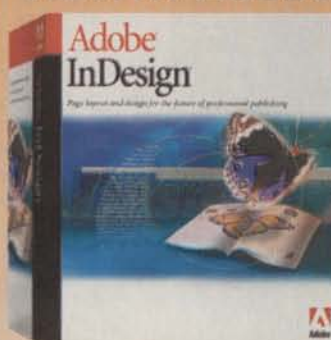
Adobe Photoshop 5.5 delivers a complete integrated image-

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### NEW!!! Adobe InDesign®



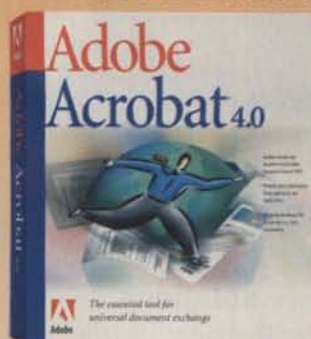
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Adobe InDesign software is a new state-of-the-art page layout program that delivers unprece-dented creative freedom, productivity, and precision while integrating seamlessly with Adobe's other leading design programs. Created for high-end graphic designers, production artists, and prepress professionals, Adobe InDesign removes the creative barriers presented by previously available publishing software, providing a powerful new set of tools that can shorten the distance between inspiration and reality.

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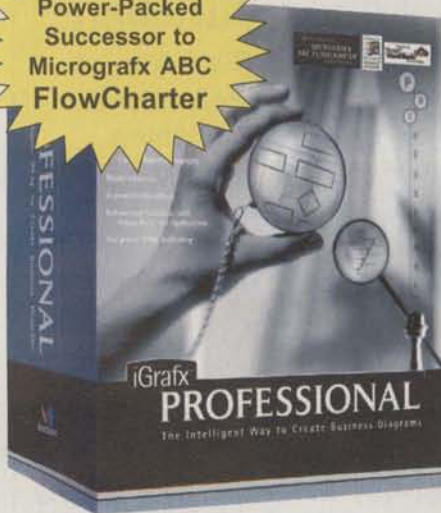
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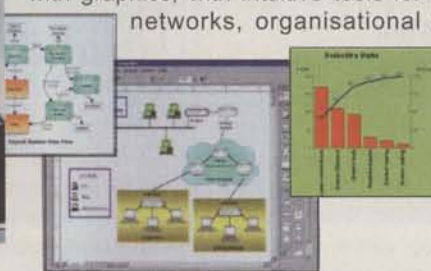


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### The intelligent way to create business diagrams

iGrafx Professional from Micrografx is the only diagramming solution with unique built-in intelligence. It's the most powerful way to visualise solutions with graphics, with intuitive tools for diagramming business processes, networks, organisational structures, and more. Includes seamless MS Office integration, robust HTML and VBA 6.0 support & network-enabled application deployment. Includes iGrafx Business and iGrafx Share.

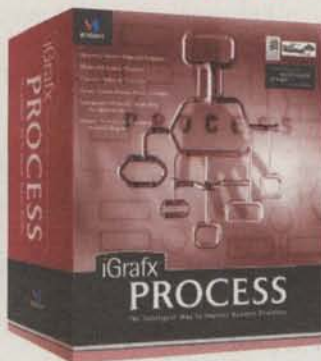


(76629)

**\$695**

iGrafx

## PROCESS



### The ultimate tool for business process improvement.

Powerfully integrated diagramming, simulation, and analysis features will help you reduce cycle times and costs, eliminate bottlenecks, re-deploy resources, and more. Features MS Office compatibility, HTML support, VBA extensibility & network-enabled application deployment. Includes iGrafx Professional, iGrafx Business and iGrafx Share.

(76631)

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iGrafx

## BUSINESS



### The intelligent graphics solution designed for today's business.

Features uniquely powerful and truly easy-to-use tools for diagramming and drawing, image editing and 3D. Features MS Office compatibility, 400+ templates, HTML publishing, helpful wizards, and 25,000 pieces of business art. Also includes iGrafx Share which allows all users to easily view, add, share and organise graphics and files.

(76630)

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## DESIGNER



### Create powerful, intelligent graphical solutions.

iGrafx Designer is the only complete toolset for technical and Web graphics with micron-accurate scale drawing, creative tools and imaging graphics for publishing and the Web. Features: transparent vector effects, object and layer browser, customisable object association and more. Includes iGrafx Business and iGrafx Share.

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## Now automatically fixes spreadsheets!

# Think Y2K won't affect spreadsheets?

## Think again!

With 1st January 2000 fast approaching, end user developed applications (including spreadsheets and databases) represent every bit as much risk from the Millennium Bug as mainframe systems.

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A two-digit year near the 1900/2000 cusp.  
Excel 95 thinks it's 1922.  
Excel 97 thinks it's 2022.  
If you upgrade to Excel 97 the value is going to change!

Hidden cell! Contains a date function that references a two-digit date. Will produce incorrect results post 12/99!

ERROR. Excel 95 thinks this value is 1925. It should be 2025. We now have a negative superannuation value being calculated at cell F5! If it wasn't colour coded would you have found it in a large spreadsheet?

	A	B	C	D	E	F
1	<b>Superannuation Calculations</b>					
2						
3	Employee Name	Birthdate	Start Date	Super Date	Final Salary	Super Amount
4	Karim Teja	7/1/71	30/07/92	25/12/25	\$4,606.56	\$8,172.8
5	James Love	23/5/55	25/05/86	10/05/10	\$4,545.97	\$2,187.07
6	David Crest	27/7/22	05/09/78	04/09/83	\$4,824.72	\$462.47
7						
8						
9						
10	Department Total					\$ (3,508.25)
11	Projected Value at Future Date					
12	Employee:	David Crest				
13	Date (mm/yy):	05/99				
14	Projected Value	\$ 71,788.66				

Not a date, but is affected by a date related function and a cell near the 1900/2000 cusp.

Hidden cell. Not a date, but a formula using the number 365! Better check this as 2000 is a leap year.

Not a date and not a date function, but is affected by a cell which is!

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(49422)

**Visio 5.0 Enterprise 10 User:**  
**\$13,158**  
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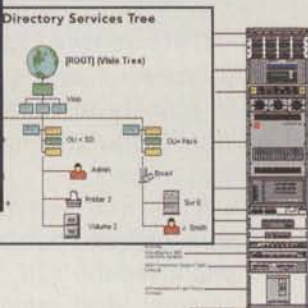
**Visio IntelliCAD 98 10 User:**  
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(58629)



(70541)

**\$1,549**

### Visio Enterprise



#### Design & model your enterprise information architecture

The ideal tool for designing networks and modeling databases and software applications across an enterprise information infrastructure. Use SNMP-based network AutoDiscovery™ technology and 14,000 exact-replica network equipment shapes to automatically diagram LANs and WANs, diagram wiring closets, and design directory structures. Re-engineer databases from leading vendors like IBM, Informix, Microsoft and Oracle. Synchronize models with data-bases, create customizable reports, and generate and edit DDL scripts. Design UML 1.2 software models and share them through Microsoft Repository 2.0.



(58627)

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#### The smart, new choice for CAD professionals

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- ActiveX integration: insert whole IntelliCAD drawings (or parts) into a Microsoft Office file or a Visio Technical schematic
- Visual toolbar and menu customizing



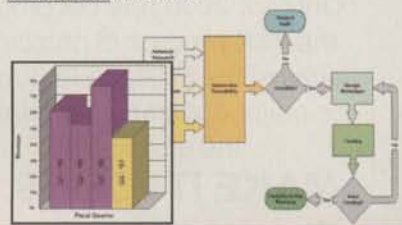
### Visio Standard

(49407)

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#### Create smart business diagrams quickly

Helps you diagram and track your workflow, communicate your department's reporting structure, and enhance your presentations with ease. Plus, it shares a common interface with your Microsoft tools for smooth integration with your desktop. With its intuitive, drag-and-drop approach to drawing, you'll be producing diagrams and inserting them in your **Microsoft Office documents** in no time.



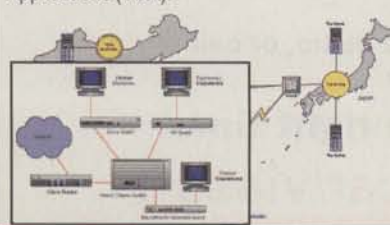
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Work with 980 network & telecom shapes, including more than 600 manufacturer-specific shapes. Design software projects using UML and other leading software design methodologies. Reverse-engineer ODBC-compliant databases or generate Microsoft Access databases from your diagrams or flowcharts. Create custom solutions with built-in Microsoft Visual Basic for Applications (VBA).



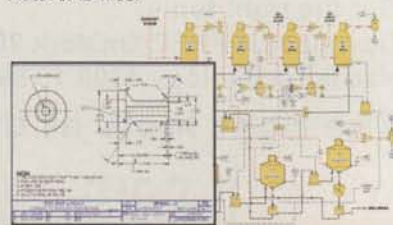
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#### Create and share 2D technical drawings more efficiently

Spans the needs of 2D technical drawing professionals. Create drawings by dragging and dropping intelligent SmartShapes® symbols that behave like the bolts, stairs and other real-world objects they represent. Need to modify your design? Just right-click a shape and choose options that instantly update that shape. It also provides read and write support of Auto-desk Auto-CAD files.



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# Where design connects to the PC

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Quick, precision drawing tools boost your drawing productivity. AutoCAD LT 98 software gives you the ability to create, review, and modify your drawings quickly. So you can speed through file operations,

work faster with accelerated display operations, and create, select, and edit objects quickly. With AutoCAD LT 98, sharing and reusing design information among design team members is a snap.

Full Version (70417)

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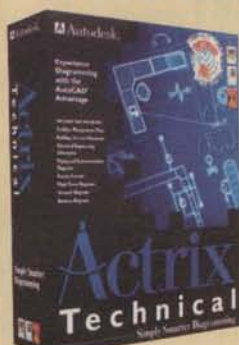
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## Actrix Technical



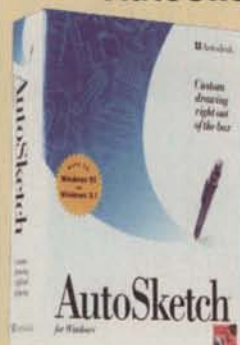
Actrix™ Technical is a 2D diagramming tool that provides a truly automated drawing environment for easily creating a full range of dynamic drawings, from facilities plans to technical schematics to business diagrams. Actrix Technical software establishes a new standard for intuitiveness and simplicity. Just select the template that suits your task and browse the catalogs you're shown. Then drag and drop the ActiveShapes™ objects you need into your diagram or drawing. You can even directly manipulate them on-screen. All in a familiar Microsoft® Windows® environment.

(79021)

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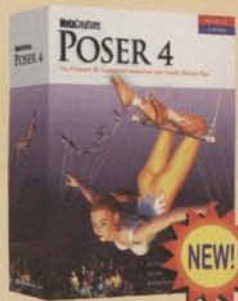
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product

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Microsoft Certified System Engineers are recognised throughout the world as experts and demand for their knowledge and expertise is continually rising. Base salaries and bonuses offered to MCSEs are the highest among certified systems engineers of any vendor.

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LearnKey's status as a Microsoft Independent Courseware Vendor (ICV) allows us to produce training products that follow Microsoft's MCSE exam

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#### Can you handle the Salary?

In Australia salary ranges from \$30,000 for a person with no experience to \$100,000+ for experienced individuals - and they are rising fast!. MCSEs are overwhelmingly the most sought-after Microsoft Certified Professionals in the industry, with annual bonuses that are also the highest among their peers. With LearnKey's MCSE Bundle and MasterExam, you're on the quickest road to becoming a qualified MCSE. What are you waiting for?

#### Is there work for MCSE qualified people?

Is there work? You better believe it! According to industry sources there are approximately 30,000 unfilled IT

vacancies - many for NT skills - in this country alone, and MCSE is an internationally recognised qualification!

#### Comprehensive "all in one" Training Bundle

We've combined videos, CD-ROMs and Approved Microsoft Sybex Study Guides in our MCSE training bundles to form an integrated and comprehensive self-study program. You'll be able to see, hear, and do everything the instructor asks of you during interactive exercises and testing sessions. When you've completed your studies and hands-on exercises, you'll be ready to face MasterExam.

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Welcome to our August catalogue, jam packed with your favourite products, all at the best prices. Take time to have a look at the IBM Aptiva range on page 5. These PCs offer fantastic value, with a price and specification to match your budget. If you would like to customise your own Aptiva, or the value PC on this page, please visit our web site at [www.iswh.com.au](http://www.iswh.com.au)

Those of you who regularly visit our website will have noticed a few changes to the design, and a great deal more content. We designed it this way after consulting a group of customers, and building what they wanted to see rather than what we wanted to do! Feel free to tell us what you think on [feedback@iswh.com.au](mailto:feedback@iswh.com.au)

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See page 14

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IBM083	Aptiva 457	Intel Celeron 433MHz	64Mb	8Gb	40x	K56 V90	3D 8Mb	15"	<b>\$2399</b>
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*A Perfect Introduction to Colour Printing at Home*

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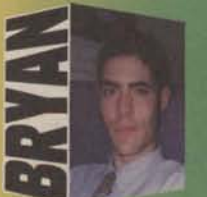
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HP DeskJet 695C  
HWP365

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HP DeskJet 710C  
HWP346

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HWP258

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## HP DeskJet 810C

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HP DeskJet 810C  
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HP OfficeJet 635  
HWP209

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CAN094

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Cartridge!  
\$75

Canon BJC-80 Portable Printer  
CAN001

**\$335**



## **BJC-4650**

*Finally - affordable A3 colour printing!*

- Full colour printing up to A3 - for CAD, DTP and design work.
- Convert your printer into a colour scanner with the optional scan head.
- Automatic switching for Windows and Macintosh.
- PhotoRealism, the gold standard, near silver-halide photographic quality.
- Drop Modulation Technology™ for improved colour gradations, on any paper.
- Image Optimiser improves quality of images down-loaded from the Internet.
- Optional high-speed black ink cartridge for B&W printing.

Optional  
colour scanhead  
available  
CAN099 \$149

Canon BJC-4650 Printer  
CAN218

**\$409**



## **BJC-5000**

*Dual cartridge system supports all your printing needs*

- Resolution up to 1440 dpi, dual drop sizes, optional PhotoRealism inks and up to 7 colours.
- Two cartridges side by side minimising cartridge travel and increasing print speed up to 7.5 pages per minute in black or up to 2.85 pages per minute in colour.
- New inks produce a blacker richer black for finished correspondence.
- Tailor output to your needs with multiple cartridge combinations and paper sizes up to A3.
- 3 cartridges in the box - 2 x BC-23 black cartridges and a BC-21e colour cartridge with Drop Modulation Technology and a cartridge storage container - fantastic value for money.

Canon BJC 5000 Printer  
CAN101

**\$519**



A3  
CAPABLE!  
Perfect for full  
Bleed A4 &  
Banners !!

## **BJC-7100**

*Advanced, sophisticated colour system*

- 7-colour ink system and up to 25 levels of tonal gradation for incredibly rich photographic half-tones.
- 90 times more colour combinations than conventional CMY inks.
- High and low density inks define difficult to reproduce skin tones.
- PhotoRealism printing on plain paper.
- Superior plain paper performance.
- P-POP (Plain Paper Optimised Printing) gives plain paper a coated paper quality finish for better looking output.
- Documents printed with P-POP are 99.4% water fast!

Canon BJC-7100  
CAN100

**\$499**

**Canon**

**Canon Ink  
Cartridges**

CAN063 BC02 BLK	\$55
CAN008 BC03 BLK	\$55
CAN064 BC05 CLR	\$65
CAN007 BC06 PHOTO CLR	\$65
CAN023 BC06KIT PHOTO CLR	\$79
CAN231 BC10 BLK	\$75
CAN024 BC20 BLK	\$65
CAN065 BC22KIT PHOTO CLR	\$109
CAN084 BC11C CLR	\$39
CAN015 BC21E CLR	\$89
CAN226 BC62Photo Head	\$99

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### PAGIS PRO 2.0

#### 4 POWERFUL SCANNING PRODUCTS

IN 1 EASY TO USE PROGRAM!  
The ultimate scanning suite for both photos & documents!

More than high quality colour scanning, Pagis Pro 2.0 offers incredible time-saving features like visual filing, Pro OCR, photo-editing, colour copying, faxing, forms fill-in, annotations, easy E-mailing of colour photos and so much more. Now discover all the ways Pagis Pro will make your scanner more valuable.

XEROX

**\$209**



## HP ScanJet 3200C

### Easy to use scanner for excellent results

This one pass colour and mono flatbed scanner is so easy to use that you will be scanning in minutes. It offers a complete and versatile solution for photo's text and more. HP software guides you through each scan in a few easy steps and even scans directly to or from your software application and HP Intelligent Scanning Technology delivers great results automatically.

#### Features

- resolution 600dpi optical; 600 x 1200 hardware; 9600dpi enhanced
- less than 90 seconds for 4x6" colour photo, less than 2.5 mins for full page text, less than 2.5 mins for black & white drawing
- 30-bit internal hardware
- maximum document size - 216mm x 297mm
- includes CD-Rom with HP PrecisionScan LT scanning software with OCR and Adobe PhotoDeluxe
- supports multiple file formats
- enhanced parallel interface for Windows 95 or 98
- includes parallel cable and power cord



HP ScanJet 3200C  
HPS027

**\$185**



## HP ScanJet 5200C

### Highest productivity for business

All the features of the 4100C plus:

- Line art enhancement
- Preview outline by region type
- Auto page format retention
- Additional software - Adobe PhotoDeluxe Business Edition, valued at \$99
- 600dpi optical, 9600dpi enhanced
- On-line e-mail and web task software
- USB and Parallel Port capable
- Completes scan job twice as fast as before
- Scan line art for enlargement with no loss of quality



HP ScanJet 5200C  
HPS026

**\$465**



## HP ScanJet 4100C

### The easiest scanner for home

If you need an easy scanning solution, try the HP ScanJet 4100C. Everything you need for unmatched ease and convenience is right in the box, including software to scan, copy, make changes, store or print.

#### 4100C Features

- Push button scanning
- Dual image scanning
- 1200 dpi
- Integrated OCR
- 36-bit colour image processor
- Scan direct to application (drag & drop)
- Guided workflow for quick results
- Front panel scan and copy buttons
- Easy to set up and fast operation with Universal Serial Bus (USB)



HP ScanJet 4100C  
HPS030

**ONLY \$249**



## HP ScanJet 6200C

### Best image quality for professionals

All the features of the 5200C plus:

- Increases productivity by up to 4 times over comparable scanners
- Networkable scanner for high workgroup productivity
- Capable of unlimited enhanced resolution for quality image capturing
- USB/SCSI capable
- HP PrecisionScan LAN for network sharing
- Intelligent Assistance
- Unlimited enhanced resolution
- Advanced imaging controls
- 35mm slide scanning (6250C only\*)



HP ScanJet 6200C  
HPS020

**\$745**



HP ScanJet 6250C  
HPS021

**\$939**

## OmniPage Pro v9.0 Upgrade

### The World's Best OCR Just Got Better

OmniPage Pro 9.0, the latest version of the world's best-selling optical character recognition (OCR) software, lets you quickly and easily convert scanned pages into computer-editable documents, more accurately than ever before. Other new features include enhanced integration with Microsoft Word, and multithreading for faster processing.

- **Maximum Zone Flexibility**  
OmniPage Pro 9.0 identifies regions of text and graphics on a page to improve recognition and formatting.
- **Superior Integration**  
Perform all your OCR functions directly from Microsoft Word - and proof your results by comparing them to the original image.
- **Automatic Proofreader**  
Automatically checks your OCR results and displays the original image for comparison. Like a spell checker, it highlights suspicious words and suggests corrections.
- **Easy, One Button OCR**

With just one click of a button, our AutoOCR Toolbar guides you through the entire OCR process. Or simply let our OCR Wizard do it for you.

- **Retains Original Page Layout**  
OmniPage Pro's enhanced True Page preserves your documents' original "look and feel."
- **Tables and Spreadsheets**  
OmniPage Pro 9.0 automatically detects tables within documents and preserves them as table objects in Word and WordPerfect. And now you can save spreadsheets directly to Excel, 1-2-3 or Quattro Pro with formatting just like the original.

- **Over 99% Accurate**  
Major improvements in our OCR technology mean you can accurately recognise a greater variety of documents, with far fewer errors.
- **Colour**  
For the first time ever, OmniPage Pro lets you scan colour documents and save colour graphics into your word processor.

**OMN021**  
OmniPage Pro 9.0 U/G  
(OEM)  
**ONLY \$199**  
when purchased  
with a scanner



OmniPage 9.0 U/G  
(Upgrade from ANY  
OCR Software)  
OMN020

**\$209**

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# ONE STOP COMPUTER SHOPPING

SCANNERS SCANNERS SCANNERS SCANNERS SCANNERS

## THE SAME GREAT SCANNER CHOOSE YOUR CONNECTION

### UMAX® Astra 1220 Series

The ideal scanning solution for the SOHO or Corporate user!

If you're looking for a scanner with speed, quality and reliability, look no further than the Astra 1220 Series. Incorporating UMAX's exclusive Bit Enhancement Technology (BET™), scanned images are given greater clarity, sharpness and colour depth, guaranteeing a better quality image every time!

#### Features

- 1200x600 dpi optical resolution
- 9600 dpi max. resolution
- 36 bit colour depth (with BET™)
- 216mm x 297 scan area (A4)
- Your choice of SCSI, Parallel (PC) or USB connectivity
- Optional Transparency adaptor

#### Software

- Adobe PhotoDeluxe
- UMAX VistaScan
- Caere OmniPage OCR
- Presto! PhotoAlbum (Win only)
- Presto! PageManager



USB UMAX Astra 1220U  
UMA012

**\$279**

SCSI UMAX Astra 1220S  
UMA015

**\$419**

Parallel UMAX Astra 1220P  
UMA014

**\$199**

Optional Transparency Scanner  
UMA021

**\$299**

### FEATURES NOT FOUND IN OTHER FLATBED SCANNERS

CALL  
NOW FOR  
PRICING

Want more from your scanner?

For the Graphics Pro

High Density Range

More Colour

Mirage II

PowerLook III

## MICROTEK HIGH-TECH SCANNERS

### MICROTEK ScanMaker 4

The MICROTEK ScanMaker 4 is 2 scanners in 1

It's both a professional quality flatbed scanner and a transparency scanner using Microtek's patented E.D.I.T. technology! Special film holders are used to scan slides & transparencies directly inside the scanner, thereby eliminating the loss of optical quality caused by glass. Compared to cheaper scanners, the Scanmaker 4 delivers better line art, better shadow detail and improved clarity especially when scanning transparencies.

- Patented E.D.I.T. technology
- 36 bit colour
- 1200x600 dpi optical
- 3 light sources
- Dynamic range 3.30
- Very Fast
- Includes Adaptec PCI SCSI



Bundled with professional software including

- Silverfast
- Scanzwizard Pro
- MSP ColorSync scanner profile software
- Fractal Painter
- Photoshop 5LE
- Omnipage LE OCR

pc world  
BEST BUYS

Microtek ScanMaker4  
Pro528

**\$1379**

### MICROTEK ScanMaker X6



The Microtek ScanMaker X6 offers a sharper image, much higher resolution, superior colour accuracy and much better shadow detail compared to entry level scanners. A better scanner means you don't waste your time correcting every scan.

To make sure the X6 offers unbeatable value, an exceptional collection of quality software is offered. This includes Windows software for image editing, OCR (text recognition), document management, a utility to SCAN to Print/Fax, a large library of backgrounds and stock photography.

For Windows users, a genuine Adaptec 1505AE SCSI card is supplied which lets you daisy chain other external SCSI devices (e.g. SCSI Zip drive, tape drive, CD writer, slide scanner).

- Higher resolution than HP 6100CI
- 36 bit (1 pass)
- 4 times the definition of entry level scanners
- 1200 x 600 DPI Optical
- 9,600 DPI Interpolated
- A4 Size
- FlexScan lid
- Zero Reflection Design
- Advanced Image Enhancer
- Great bundled software
- Tri-linear CCD sensor array
- Dynamic range: 3.2
- 12 months warranty

Microtek ScanMaker  
X6 USB  
PRO033

**\$399**

Microtek ScanMaker  
X6 Parallel  
PRO526

**\$399**

PRO523 Microtek ScanMaker X6 SCSI ..... **\$475**

For the cost of a local call **EXPRESS Orderline 1300 300 003**  
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ONE  
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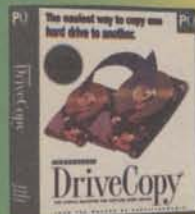
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PAGE 11





## DRIVE COPY 2

THE EASIEST WAY TO COPY  
YOUR OLD HARD DRIVE TO  
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Drive Copy 2 makes upgrading to a new hard drive easy. You can copy everything, including multiple partitions and operating systems, from one hard drive to another in minutes. You can even copy selected partitions to a larger or smaller drive. Copying hard drives now takes minutes instead of hours!

**\$49**

CHK022



## Memory Pricing

### PC100 SDRAM DIMM (168 pin)

Size	Access Time	Price	Stock Code
32Mb	7ns	<b>\$75</b>	MEM100
64Mb	7ns	<b>\$135</b>	MEM101
128Mb	7ns	<b>\$299</b>	MEM102

### PC100 ECC SDRAM DIMM (168 pin)

Size	Access Time	Price	Stock Code
128Mb	7ns	<b>\$379</b>	MEM103

### SDRAM DIMM (168 pin)

Size	Access Time	Price	Stock Code
32Mb	10ns	<b>\$79</b>	MEM104
64Mb	10ns	<b>\$169</b>	MEM105
128Mb	10ns	<b>\$299</b>	MEM106

### GETTING THE RIGHT TYPE OF MEMORY IS IMPORTANT!!

If you have a BX motherboard, you need PC100 memory

If you have an LX motherboard, you can use either SDRAM or PC100 SDRAM. Both types of memory will work. By purchasing PC100 memory, you will future proof your memory should you decide to upgrade your motherboard, or upgrade your processor over 350MHz.

If you are buying memory for a server with a processor speed over 350MHz, use PC100 ECC SDRAM.

EDO RAM is used for older Pentium machines. Supply of EDO RAM is becoming more and more constrained, and has caused volatility in pricing. Please call our sales team for the latest pricing, or for any advice on your requirements on 1300 300 003.

### MEMORY PRICES ARE VOLATILE - CALL FOR LATEST PRICES

## Quantum Quality Hard Drives at Affordable Prices

QUANTUM  
8GB ONLY  
\$269!



IDE	Drive	Model	Speed	Access Time	Price	Code
	Fireball CR 4.3GB	QM304300CR-A	5400rpm	9.5ms	<b>\$199</b>	QUA175
	Fireball CR 6.4GB	QM306400CR-A	5400rpm	9.5ms	<b>\$249</b>	QUA170
	Fireball CR 8.4GB	QM308400CR-A	5400rpm	9.5ms	<b>\$269</b>	QUA176
	Fireball CR 13.0GB	QM313000CR-A	5400rpm	9.5ms	<b>\$359</b>	QUA177
SCSI	Drive	Model	Transfer Rate	Access Time	Price	Code
	Atlas IV 9.1GB Wide Ultra	QM309100KN-LW	up to 160MB/sec	6.9ms	<b>\$799</b>	QUA178
	Atlas IV 9.1GB Ultra SCA	QM309100KN-SCA	up to 160MB/sec	6.9ms	<b>\$799</b>	QUA179
	Atlas IV 18.2GB Wide Ultra	QM318200KN-LW	up to 160MB/sec	6.9ms	<b>\$1599</b>	QUA180
	Atlas IV 18.2GB Ultra SCA	QM318200KN-SCA	up to 160MB/sec	6.9ms	<b>\$1599</b>	QUA181

FOR FURTHER INFORMATION, OR PRICING ON HARD DRIVES NOT FEATURED, PLEASE CALL OUR SALES TEAM ON 1300 300 003

### REMEMBER: HARD DRIVE PRICES FLUCTUATE - CALL FOR LATEST PRICE

## Need more Space? Get a Seagate Ultra-ATA Hard Drive Upgrade Pack

Everything You Need for a Successful and Easy Drive Installation on your Pentium or equivalent PC

The upgrade pack includes:

- Full step-by-step installation guide. Never opened your computer before? Don't worry. This step by step guide will take you through it, from installing the drive to loading your software.
- Frame kit, screws and mounting brackets. Ever gone to upgrade your PC, only to find that you haven't got all the bits you needed? Not with this kit! Everything is included.
- Seagate Ultra-ATA Hard Drive.
- Wrist Strap. Don't blow your machine up with static electricity! The guide explains how to use the wrist strap to prevent static electricity from destroying your CPU or your RAM when installing your new hard drive.
- Each Seagate Hard Drive Kit comes with a 3 year warranty, so you can buy with confidence



SEAGATE MODEL	ST34312A	ST36421A	ST38422A	ST310232A	ST313032A	ST317242A
FORMATTED CAPACITY	4300MB	6400MB	8400MB	10200MB	13000MB	17200MB
SEEK/ms	9.0	10.5	9.0	9.0	9.0	9.0
SPINDLE SPEED	5400RPM	5400RPM	5400RPM	5400RPM	5400RPM	5400RPM
DATA BUFFER	512K	256K	512K	512K	512K	512K
FORM FACTOR	88.9mm	88.9mm	88.9mm	88.9mm	88.9mm	88.9mm
TRANSFER RATE	33.3/66.6ms	33.3/66.6ms	33.3/66.6ms	33.3/66.6ms	33.3/66.6ms	33.3/66.6ms

Seagate 4.3GB  
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SEA201  
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## The Big Capacity, Take-It-Anywhere Drive

**It's light. It's portable.**

And now, with 250MB at your fingertips, it holds more files than ever before. 250MB Zip disks are big enough to handle just about anything - the equivalent of 170 floppies! And unlike CD-ROMs, you can rewrite to Zip disks. Slip it in your backpack. Place it in your briefcase. At less than 0.5kg, the 250MB Zip is the easiest way to take your important files wherever you go. And don't forget, you can use 100MB\* Zip disks in your 250MB Zip drive. So you've got the best of both worlds. With over 100 million Zip disks sold, the 250MB drive is the only way to go for collecting, creating and sharing your files.

iomega Zip Drive 250 (Parallel)  
IOM100

**\$345**

iomega Zip Drive 250 (SCSI)  
IOM101

**\$355**

For more information on which drive is right for you, contact our sales team on 1300 300 003



\* 100MB capacity where 1MB=1million bytes. The capacity reported by your operating system may differ.

iomega Jaz 2GB (Int)  
IOM082

**\$699**

iomega Jaz 2GB (Ext)  
IOM083

**\$649**

iomega BUZ  
IOM080

**\$339**

iomega Zip100 USB  
IOM098

**\$249**

iomega Zip Starter Kit(Parallel)  
IOM096

**\$259**

## FULL RANGE OF IOMEGA PRODUCTS AVAILABLE

### **Clik! Drive for Digital Cameras - The compact, go-anywhere storage solution**

Here's how the Clik! Drive for Digital Cameras works:

(Clik! Drive only works with cameras that have removable memory)

- 1 Take pictures on your digital camera and when your memory card is full simply remove the flash card and pop it into your Clik!(tm) Mobile Drive Flash Memory Reader.
- 2 The Clik! Mobile Drive quickly downloads your photos to a Clik! disk.
- 3 The Clik! Desktop Docking Station makes getting pictures into your PC easy and fast. And the Clik! software makes it easy to view, organise and print your photos.
- 4 Just place the drive in the dock and pictures can be downloaded from the Clik! disk in a snap. The Clik! Desktop Docking Station also acts as the recharger for your battery pack.
- 5 Clik! disk, the 40MB\*\* go-anywhere storage, gives you the world.

iomega Clik! Drive for Digital Cameras  
IOM105

**\$475**

Includes:

**Clik! Mobile Drive.** Weighing less than 200 grams, the mobile drive is the connection between your digital camera and 40MB\*\* Clik! disks.

**Clik! Flash Memory Reader.** Accepts CompactFlash or SmartMedia memory cards from most brands of digital cameras. Connects to your Clik! Mobile Drive and allows you to download the pictures on your flash card to your mobile drive in seconds.

**Clik! Disk.** The two-inch by two-inch Clik! disk holds 40MB\*\* of data, or up to 40 high-resolution photos or hundreds of compressed images. Use them as your negatives.

**Rechargeable Battery.** The nickel-metal hydride (NiMH) battery snaps right on to your mobile Clik! drive and has enough power for lots of downloads of your camera's memory.

**Desktop Docking Station.** Simply connect the dock to your parallel port, place the Clik! Mobile Drive in the dock and you can quickly transfer data from the Clik! disk to your desktop machine or vice versa. Also serves as the recharging station.

**Parallel Port Interface.** Makes installation fast and easy.

### ANNOUNCING New Clik! PC Card Drive

offers a great mobile storage solution for notebooks at an affordable price.

Bundle includes

- 40MB Clik! PC card drive (comes with hard cover case)
- 40MB Clik! disk
- CD-Rom (with operating software)
- User's manual

\*\* 40MB capacity where 1MB = 1 million bytes. The capacity reported by your operating system may vary.



iomega Clik! PC Card Drive  
IOM120

**\$379**

### Clik! Drive Plus

is designed for users with both digital cameras and mobile computer needs. Bundle includes Clik! Mobile Drive, NiMH Rechargeable Battery, Flash Memory Reader, PC Card Interface, Parallel Port Interface, Universal Power Supply, 40MB Clik! Disk, Clik! Software CD-ROM and Clik! Carrying Case.

iomega Clik! Drive Plus  
IOM116

**\$539**

iomega Clik! Disks 2 Pack  
IOM106

**\$65**

iomega Clik! Disks 10 Pack  
IOM107

**\$175**



## iomega

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IOM099 .....\$45

NEW! ZIP 250Mb Disks PC 10-PK

IOM102 .....\$319

IAZ Traveller

AUP163 .....\$89

IAZ 1Gb Disk PC 3-PK

IOM032 .....\$519

IAZ 2Gb Disk PC 1-PK

IOM097 .....\$199

IAZ 2Gb Disk MAC 1-PK

IOM006 .....\$199

IAZ 2Gb Disks PC 3-PK

IOM089 .....\$579

IAZ 2Gb Disks MAC 3-PK

IOM078 .....\$579

Clik! PC Card Interface

Clik! PC Card Cable

NiMH Battery

Universal Power Supply

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**\$9.50**  
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Bulk pricing  
(100 or  
more)  
available.  
Call our  
sales team  
for details.



## CD-ReWriter Plus 7510e

**hp** HEWLETT *Easy Installation 6x*  
PACKARD *2x 2x*  
Expanding Possibilities

- Easy installation, plugs straight into your parallel port, easily transferred between computers.
- Create your own music CD's that can be played in any CD audio player. ACID Music Creator.
- Automatically back-up and index your files - fast with HP Simple Trax 2.0.
- Adaptec Direct CD & Easy CD Creator makes it easy to write data, photo, audio and video files to a CD.
- HP Disaster Recovery quickly and easily restores your hard drive files and operating system in minutes.
- HP Fast Format writes or formats CD-RW's in less than 5 minutes.
- Includes one free blank CD and CD-RW.

**FREE**  
Software  
bundle  
valued at  
**\$500**



For a limited  
time, every HP cd-  
writer plus comes with  
a free CD Wallet that  
holds 20 cds!

HPP045

**\$625**

## CD-ReWriter Plus 8200i

**hp** HEWLETT *The fastest, easiest way*  
PACKARD *to make your own*  
Expanding Possibilities *CDs 24x 4x 4x*

- The perfect tool to develop your own multi-media presentations, projects and more. Get thousands of images, clipart and photos to help you create distinctive and creative presentations with Broderbund Multimedia Organiser.
- CD Labeler comes complete with the kit that allows you to label your jewel case.
- Automatically back up and index your files to CD and find them even faster, even if you can't remember the file names with HP Simple Trax.
- Quickly and easily restore your hard drive files and operating system with HP Disaster Recovery.
- Write to CD-RW in less than 5 minutes with HP Fast Format - save hours of formatting time.
- Drag and drop - use like a floppy.

**FREE**  
Software  
bundle  
valued at  
**\$300**



HPP044

**\$625**

## HP CD-ReWriter Plus 7200e

External 6x Read, 2x Write, 2x ReWrite

**SAVE \$280 WITH THIS SPECIAL BUNDLE!**  
**YOU GET ALL THIS FREE!**

- Adaptec DirectCD
- EasyCD Creator
- HP Fast Format
- Simple Trax
- Disaster Recovery
- Adobe PhotoDeluxe
- Corel Print House
- DocuMagix
- Norton Antivirus
- Photo Organiser
- Adaptec Jewel Case
- Easy CD Audio
- 1x CD-R disc
- 1x CD-RW disc



**AMAZING**  
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**LIMITED STOCK ONLY**  
**300 AVAILABLE**

HPP012

**ONLY**  
**\$529**

## Kodak IDE CD-ReWriter Kit

Kodak's latest CD-R offering delivers the best of all worlds in a feature-rich package. The new 4802 drive offers fast 8X read performance coupled with 4X write once and 2X re-write capabilities, making it the perfect all-round CDR solution. Drag and drop files from your desktop, copy CD's in less than 20 minutes, or create your own audio CD's using the supplied HiFi cable and software. It's all possible with a Kodak CD Recorder!

### Features

- 4X recording means full CD's can be ready in less than 20 minutes
- Hook up your sound card to a HiFi system to record tracks from any source using the supplied cable
- Gazo Personal Image Warehouse software included
- 2Mb buffer for stable recording
- Supplied with PacketCD software, providing simple drag-and-drop CD-recording from the desktop

KOD048

**\$449**



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# ONE STOP COMPUTER SHOPPING

MULTIMEDIA MULTIMEDIA MULTIMEDIA MULTIMEDIA



External Product shot for illustration purposes only

## Verbatim Smart and Friendly CD Racer 2224 Internal IDE

The Smart and Friendly CD-RACER CD-Recorder with CD-RW ReWritability Writes at 2x, ReWrites at 2x and Plays back at 24x with a plentiful 2Mb buffer. The CD-Racer is a low-cost CD-Recorder solution that brings you new levels of performance and technology. The CD Racer includes a comprehensive software suite including Adaptec Easy CD Creator Standard Edition, MediaPath MediaAgent, ECI Disc Inspector Pro, Smart and Friendly CD Consultant and Diamond Cut Enhance/CDR and includes all necessary accessories.

VER078  
**\$495**

## Verbatim Smart and Friendly CD SpeedWriter Plus 4224 Internal IDE

The Smart and Friendly CD SpeedWriter Plus is the second generation of the award winning CDSpeedWriter. The CD SpeedWriter Plus is a 4x Write, 2x ReWrite, 24x Playback CD-Recorder with a plentiful 2MB buffer. The CD SpeedWriter Plus can create a full 650MB CD in as little as 17 minutes. It is ideal for music and audio storage, data archiving and backup, disaster recovery, digital imaging and a whole range of multimedia applications. The CD SpeedWriter Plus includes a comprehensive suite of popular including Adaptec Easy CD Creator Standard, PowerQuest Drive Image, Diamond Cut Enhance/CDR, Sonic Foundry CD Architect, Sonic Foundry Sound Forge XP, MediaPath MediaAgent, ECI Disc Inspector Pro, Smart and Friendly CD Consultant.

IDE (Internal)  
VER079  
**\$509**

SCSI (External)  
VER082  
**\$899**

## Verbatim Datalife Plus CD-R and CD-RW discs

Verbatim CD-R and CD-RW discs encompass the latest technology for superior performance. They feature a proprietary Metal AZO dye (which offers the best protection against sunlight), multi-speed recording, scratch-resistant, protective coating, a fully printable surface and across the board writer compatibility.

Single CD-R  
VER043  
**\$3**

6x  
Spin

10 Pack CD-R Media  
VER080  
**\$29**

Single CD-RW  
VER081  
**\$12.95**

## TURN ORDINARY VIDEOS INTO EXTRAORDINARY VIDEOS WITH Studio 400 & Studio DC10 Plus

Whether you want to edit videos of the kids and want a simple plug and play editor for your home PC, or you're putting together a corporate presentation or editing video for your web site, there is a Pinnacle Studio editing product for you

### Both the Studio 400 and Studio DC10 Plus feature:

- Pinnacle's award winning Studio editing software which offers users simple drag and drop editing, plus 100s of special effects.
- TypeDeko titling software for giving your productions professional looking titles.
- SmartSound Studio software for generating background music and for adding narration or a CD soundtrack to your movies.

- Microsoft Direct Show technology for instantly previewing your movie.
- The ability to output AVI files for the internet.
- Microsoft Net Meeting software for video conferencing.
- Hot Keys unlimited free technical support and 60-day money back guarantee.



### RECOMMENDED PC REQUIREMENTS

	Studio 400	Studio DC10 Plus
Processor	P133	P233 or Celeron 300A
Hard Drive	2GB	8GB
RAM	16MB	64MB
SCSI Drive	No	Yes*
Operating System	Win95/98	Win95/98

\* Required for capture rates above 3MB/Sec.

### WHICH STUDIO PRODUCT IS RIGHT FOR YOU?

	Studio 400	Studio DC10 Plus
Internal/External	External	Internal
Disk Space (1/2 hr vid)	75MB-150MB	1.5GB-10GB
Max Resolution Capture	160x120	760x576
	15 fields/sec	50 fields/sec
Output	720x586	768x576
	50 fields/sec	50 fields/sec
Import AVI files	No	Yes

Note: Studio DC10 Plus replaces: Miro DC10, Miro DC20, and Miro DRX

As Seen on Australia's Funniest Home Video Show



**PRICE DROP**  
~~\$669~~  
Studio 400  
NIT013  
ONLY  
**\$639**

Studio DC10 Plus  
PIN024  
**\$619**



## Easy CD Creator

- Send video postcards on CD that automatically play on any PC - no special software is required.
- Share photo albums on CD that can be viewed on any PC.
- Backup important files such as spreadsheets and tax records
- Works with recordable or rewriteable CDs.

### PACKAGE INCLUDES:

Easy CD Creator Deluxe Edition  
CD Spin Doctor  
PhotoRelay  
Jewel Case Creator  
CD Copier  
Video CD Creator  
Picture CD Creator  
25 Photo CD Pictures  
Cable to connect PC to stereo  
Users guide

ADA044

**\$149**



For the cost of a local call **EXPRESS Orderline 1300 300 003**  
Sales Lines Open 8.30am 'til 7pm (EST) Monday to Friday and 10am 'til 3pm (EST) Saturday



LEARN THE SECRETS OF THE PROFESSIONALS.



## ...WITH HOME MOVIE DIRECTOR

Now you can produce a Video Family Album quickly & easily using just your camcorder & VCR. Contains easy to follow handbooks & set up guides, script editor, video label printer plus a bonus instructional video & CD-ROM. This motion picture album is a must for all camcorder owners.

PRICE DROP

\$19

NIT020

For professional video editing, take a look at the Studio 400 on p15



## ACCELERATE YOUR WORLD WITH DIAMOND Sonic Impact S90

Unleash True Audio Fidelity in Your Multimedia PC!

Hear it all! From your favourite acoustic melody to the pulsating rhythms of heavy metal. The swish of a golf club to the screech of tires racing down the track. Diamond Multimedia's Sonic Impact S90 PCI audio card takes you there with a full spectrum of rich, dynamic sounds for all your multimedia, music, Internet, and gaming audio.

### Key Features:

- Hot positional 3D audio with Aureal Vortex technology
- Accelerates A3D, DirectSound3D & DirectSound
- Rich, brilliant sound with 64-voice DLS wavetable
- Perfect for Windows or DOS games or software
- Features MP3 tools for cutting-edge Internet audio



LIMITED STOCKS

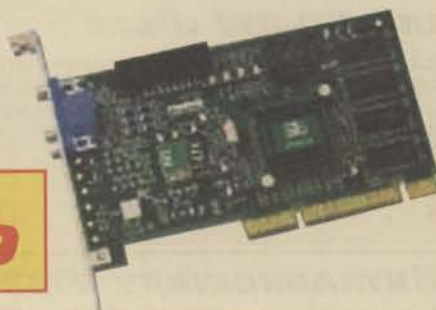
DIA060

\$65

\* Box Shown for illustration purposes only

## The SpeedStar A50

The SpeedStar from Diamond truly is the value/performance graphics accelerator for today's budget-conscious PC desktop market.



DIA051

\$109

### Key Features

- 8MB of powerful SDRAM and 200 MHz RAMDAC for high monitor resolutions
- Superior video playback - Awesome features for high-end, TV-quality video
- Optimised drivers for full compatibility with Windows 95/98 and Windows NT4.0
- Outstanding 3D with AGP 2X support for rich, razor-sharp gaming and smooth-running 3D business applications
- Fast, full-colour 2D performance with resolution support up to 1600x1200, and high, ergonomic refresh rates to 200Hz

LIMITED STOCKS

## Rio PMP300

Internet Music in the Palm of Your Hand!

Diamond's Rio PMP300 is the first portable MP3 music player that stores up to 60 minutes of digital-quality sound. It's smaller than an audio cassette and has no moving parts, so it never skips. Powered by a single AA battery, Rio provides up to 12 hours of continuous music playback. Goodnoise, the premier source on the net for high-quality, downloadable music, is located at [www.goodnoise.com](http://www.goodnoise.com).



### Key Features

- Palm size for easy portability
- Supports MP3 compression
- 32MB built-in flash memory
- Expandable playback time with removable flash cards
- Skip free - no moving parts
- MusicMatch Jukebox Limited Edition software for converting CD's to an MP3 format
- CD Music Sampler

PRICE DROP

Diamond Rio PMP 300

DIA047

~~\$399~~  
\$299

## Diamond Monster Sound MX300

The Ultimate 3D Audio Experience

Do you want heart-pounding, adrenaline-rushing sound that has you looking over your shoulder? Diamond's Monster Sound MX300 is your ticket to fully-immersive positional 3D audio, pinpointing every individual sound in 3D space and dunking you in the middle of the action for an incredibly realistic gaming experience.

### Key Features:

- Powered by Aureal Vortex-2 PCI audio accelerator
- Monstrous positional 3D audio - A3D 2.0 & DirectSound3D
- Studio-quality 320-voice DLS wavetable synthesizer
- Up to 4 speakers for a phenomenal gaming experience
- Includes DVD with complete Dolby Digital (AC-3) support
- Features MP3 tools for revolutionary digital Internet audio



DIA050

\$129

\* Box Shown for illustration purposes only

## ViperV770

Wreak Havoc with the Ultimate 3D Weapon

Experience unrivalled graphics performance with Diamond's Viper V770! Viper V770 lets you fly through high-intensity games and demanding Windows and NT business and graphics applications with the highest quality 3D graphics, rapid-fire 2D speed, and breathtaking cinema-quality video.

### Key Features

- NVIDIA RIVA TNT2 for high-speed 3D graphics
- Twin Texel engine with single-pass multi-texturing for lifelike rendering of the most complex 3D scenes
- 32-bit rendering & 32-bit Z/stencil buffer for razor-sharp images
- Rapid-fire 128-bit 2D acceleration with explosive colour
- 32MB high-speed memory and up to AGP 4X for rapid-fire graphics display
- Resolution support up to 2048x1536
- Supports the latest processor technologies from both Intel and AMD

\* Box Shown for illustration purposes only



Diamond Viper V770  
16MB  
DIA058

\$239

Diamond Viper V770  
32MB  
DIA059

\$339

## Monster Fusion

Voodoo 3D Gaming & Blistering 2D Speed!

Diamond's new Monster Fusion takes edge-of-your-seat Voodoo 3D gaming performance and fuses it with high-speed 2D acceleration - all on a single card. Based on ground breaking 3Dfx technology, Monster Fusion brings you outrageous 60 frames per second game play, state-of-the-art 3D features, and complete game support based on the most popular APIs. Your 2D presentation and Web graphics will fly on the screen in vivid color at resolutions up to 1900x1200.

### Key Features

- 3Dfx Voodoo Banshee technology
- Fully integrated 3D and 2D graphics with 16MB memory
- True 128-bit Windows acceleration
- Outrageous 3D gaming performance at 60 fps
- Awesome game support: Glide, Direct3D and MiniGL
- Available in PCI and AGP models

\* Box shown for illustration purposes only



Diamond Monster Fusion AGP  
DIA034

\$199



# ONE STOP COMPUTER SHOPPING

MULTIMEDIA MULTIMEDIA MULTIMEDIA MULTIMEDIA

## NOW AVAILABLE ON EARTH !!!

### Voodoo3 2000

From 3Dfx Interactive, the architect of the 3D revolution, comes a new dimension of high resolution gaming. A snap to install, the Voodoo3 2000 replaces tired, old 2D cards in just a matter of minutes. Fusing the worlds fastest 2D with a dual 32-bit pipeline, the Voodoo3 2000 pumps out over 100 billion operation per second.

- 143 Megapixels/second
- 286 Megatexels/second peak fill rate
- 6 million polygons/second peak processing
- 2.29GB/second peak bandwidth
- Patented single-pass multi-texturing
- 128-bit 2D, 3D and video accelerator
- Voodoo3 graphics processor
- 16MB high-speed SDRAM memory
- AGP 2x
- MPEG-1, 2 playback
- 300MHz RAMDAC

**Voodoo3 2000 AGP**  
VOO004  
**\$349**

**Voodoo3 2000 PCI**  
VOO003  
**\$349**



### Voodoo3 3000

Clocking in at over 100 billion operations per second, the Voodoo3 3000 pushes the limits of ultra high-resolution gaming. Delivering liquid smooth frame rates of over 60 frames per second, the Voodoo3 3000 combines the worlds fastest 2D with a dual 32-bit pipeline to provide a mind-altering gaming experience.

- 66 Megapixels/second
- 333 Megatexels/second peak fill rate
- 7 million polygons/second peak processing
- 2.66GB/second peak bandwidth
- Patented single-pass multi-texturing
- 128-bit 2D, 3D and video accelerator
- Voodoo3 graphics processor
- 16MB high-speed SDRAM memory
- AGP 2x
- MPEG-1, 2 playback
- 350MHz RAMDAC

**Voodoo3 3000 AGP**  
VOO001  
**\$439**



### Voodoo3 3500

Voodoo3 3500 AGP

- 16MB SGRAM
- 183MHz core clock speed
- 8 million triangles/sec
- 366 Megatexels/sec.
- Digital flat panel support
- Supports DirectX, Glide and OpenGL
- Supports resolutions up to 2048x1536
- Single pass, single cycle trilinear MIP-mapping
- Full 128-Bit 2D accelerator
- Single pass, single cycle bump mapping
- 350 MHz RAMDAC
- TV/S-Video out
- DVD hardware assist
- Alpha-blending
- Patented multi-texturing
- Programmable fog tables
- Sub-pixel and sub-textel correction
- Gouraud shading

**Voodoo3 3500 AGP**  
VOO002  
**\$679**



### ATI Rage Fury 32Mb AGP



The new ATI Rage fury is powered by ATI's Rage 128 graphics technology, with an astounding 32Mb of memory.

**ATI030**  
**\$399**

**SoundBlaster Live! Value**  
CRE053  
**\$259**

**GraphicsBlaster Riva TNT 16Mb (AGP)**  
CRE049  
**\$235**

**GraphicsBlaster Riva TNT 16Mb (PCI)**  
CRE055  
**\$235**

### 3D Blaster Banshee 16MB AGP



**Full Retail Product**

Awesome resolutions, rock solid refresh rates and stunning visual quality. Complete 2D/3D graphics solution based on the Voodoo Banshee chipset. With a full 128 bit graphics core and 16Mb of high speed SDRAM, you can see why the 3D Blaster Banshee is one of the most popular cards for graphic intensive applications and games.

**3D BANSHEE AGP**  
CRE052  
**\$229**

### Creative 3D Blaster Savage4 32MB AGP

**Real Gamers Are Savages!**

With the 3D Blaster Savage4, your gaming experience will never be tame again.

- A complete 2D/3D graphics accelerator based on the new Savage4 PRO chipset from S3(tm)
- Loaded with 32MB of high-performance memory so you can view incredibly high resolutions and display millions of colors.
- The perfect upgrade to your home computer! Speeds up virtually every Windows application and your games will run smoother and look better
- Innovative new texture compression provides the best 3D image quality possible



**Creative**  
CRE057  
**\$279**

### 40x CD-ROM Drive

Unbelievable. A blistering 40x CD drive (6000Kb/sec data transfer rate) for under \$100! This drive has a multi read function - it can read CD-RW media as well. Fantastic value at only \$99.



**OFF006**  
**\$99**

### Sony CD ReWriter

A blistering 24x read speed coupled with a 4x write once speed and 4x rewrite speed makes this the total CD/CD-R/CD-RW solution. This kit contains everything you need to get up and running. Contains the drive, authoring software, a blank CD-R and CD-RW plus a simple step by step installation guide.



**SONY45**  
**\$629**

### 6x DVD Drive

Experience tomorrows' technology today with this 6x DVD ROM drive.

Supporting DVD, CD (up to 32x), CD-R and CD-RW, you can use this drive to watch the latest movies, play the latest games or listen to your music CDs. For technical specs please check out our website at [www.iswh.com.au](http://www.iswh.com.au)

• Actual Product may vary from illustration shown.



**OFF008**  
**\$399**

### RoboCAM

USB  
DigitalCamera



- Crystal clear picture
- Plug & play (USB) interface for easy installation
- Capture up to 30fps (352 x 288 pixels) full motion video
- Support single frame snapshot up to 640x480 pixels
- Low power consumption idea for notebook computer
- Support TWAIN interface for image editing applications
- No video capture card or power adapter necessary

ASS023

**\$179**

\* Actual Product may differ from illustration.

For the cost of a local call **EXPRESS Orderline 1300 300 003**  
Sales Lines Open 8.30am 'til 7pm (EST) Monday to Friday and 10am 'til 3pm (EST) Saturday





ORB DRIVES  
...BIG GIGS

2.2GB Internal &  
External Unlimited  
Capacity:

- 3.5 hours of audio
- 2+ hours of video
- 2,000+ colour photographs
- 22 100MB floppy disks
- SCSI, EIDE or Parallel Port versions
- 1500+ 1.44MB floppy disks
- 3+ CD ROM games



ORB002 Internal EIDE

**\$379**

ORB004 External Parallel

**\$429**

ORB005 Internal SCSI

**\$379**

ORB006 External SCSI

**\$429**

ORB007 External USB

**\$579**

ORB003 ORB Disk (PC)

**\$75**



## Capview

**Portable external USB Video Capture, Conferencing and Editing**

Capture video from any camera, VCR, TV or video input device and explore what you can do on a PC using the latest video editing software. Solutions for both the Novice or professional users.

Enjoy video conferencing face-to-face with your family, colleagues or friends. Over the internet it will only cost you less than \$1 an hour! You can even record and send Video e-mail messages.

Features:

- Portable external Plug-N-Play USB device
- Video capture up to 30fps@ 352x288 and 640x480 single frame
- TWAIN compatible interface
- Video Conferencing standards H323, H263
- Includes ULead Video Studio 3.0 editing software.



ASS022

**\$139**

## Life TV USB

Now you can watch TV, Play your favourite movie, video conference, edit your own video files, or send video e-mails from a single product connected to your USB port.

Features & Benefits:

- Full motion capture (352x288 at up to 30fps) (640x480 possible on some high performance systems).
- Single frame capture using software snapshot or unique hardware snapshot (up to 640x480).
- Video capture from TV tuner, or any externally connected device (such as VCR or Camcorder).
- Twain compatible for software snapshot directly to any picture editing software which supports twain scanners.
- Send Video mail messages over the Internet using Video Live Mail.

- USB Plug-N-Play.
- Video conference live over the net using NetMeeting.

Bundled with:

- NetMeeting for Video Conferencing
- Cyberlink Video Live Mail, Greeting Card, and Image Browser.



ASS025

**\$299**

## Robo Snoop

**RoboCam USB Digital Camera Plus PC Snoop**

Video Conferencing, Personal Surveillance/Receptionist & Message Recorder Combined. "Robo Snoop" will allow users the option to perform video conferencing, surveillance, video capture, receptionist duties & message recordings, all for a great price.

The RoboCam USB Camera delivers crystal

clear pictures with the latest CMOS 300K technology.

PC Snoop integrates Stealth surveillance & Video Message Recording for Home & Office applications.



Now  
WITH FREE INTERNET  
PHONE VALUED AT \$69

ASS017

**\$275**

## Pocket Scan Converter (PSC 1106)

**Your business presentations on the big screen**

Using the Pocket Scan Converter in conjunction with your notebook computer (or PC), any presentation can be displayed on a TV or recorded onto video tape, making the Pocket Scan Converter ideal for business, education and training applications. This compact device simply plugs into your notebook/PC and the other end into a TV/Video to put your presentation onto the big screen. And when the work is done, play computer games on your TV. Designed with flicker reduction circuitry and VHS support, the Pocket Scan Converter produces extremely vivid, high quality images with up to 16.8 million colours.



ASS001

**\$189**



## COMPRO PS39 Digital Video Camera

**Instant Picture & Video For Your Desktop!**

COMPRO PS39 Digital Video Camera offers great convenience of plug and snap on any Windows PC or notebook. Simply connect the camera to the printer port, a quick software installation and you are ready to take a brilliant picture, or video conference at life like frame rates.

Superior features:

- 40 frames per second (video images)
- 1280 x 960 resolution at 16.8 million true colour still images
- Superior image quality without compression
- Adjustable focus lens (10mm to Infinity)
- Night vision capability
- Plug and Snap on all PC and note-book printer ports
- Includes PS2/AT Keyboard Adaptor, removable tilt and swivel base assembly, user manual

Great for:

- Personalised greeting card and t-shirt transfer
- Picture & Video E-mail
- Video conferencing
- Internet Home Page creation
- Jazz up reports/presentations
- Picture ID
- Digital photo album and more...

BONUS

- 3D/EYE TriSpectives 1.0 Asymetrix
- Digital Video Producer 4.0
- 3D F/X 2.0
- COMPEL 2.0
- Web 3D
- WebPublisher
- COMPRO Microphone

Comes with CD containing:

- Snapshot Image Capturing Software
- AVI Software Driver
- TWAIN Software Driver
- Microsoft NetMeeting 2.0 Video Conferencing Software
- ULEAD Video Studio Software



COMPRO PS39 Digital Video  
Camera  
CMP005

**\$329**



# ONE STOP COMPUTER SHOPPING

MONITORS MONITORS MONITORS MONITORS MONITORS

PRICE PLEDGE



We will not be beaten on price!  
See page 47 for Terms & Conditions

FREE GIFT



Make sure to ask for your gift when ordering

FAST DELIVERY



Full range of delivery options:  
-Same day, Sydney  
-Next day  
-International\*  
\*Where applicable

MASSIVE RANGE



We aim to stock at least 95% of ALL the items we sell

ONLINE SHOP



Check our online store at  
[www.iswb.com.au](http://www.iswb.com.au)

NO.1 SERVICE



As an International Company  
we have won more awards for  
products and services than  
any software mail-order  
company

Unit 13 Bradford Estate  
10 Bradford Street  
Alexandria  
NSW 2015



PAGE 19

**UMAX®**

**Maxvision B5**

- 15 inch FST
- 0.28mm dot pitch
- Non glare
- 1280 x 1024 @ 70Hz max NI



UMA016

**\$349**

**UMAX®**

**Maxvision B7**

- 17 inch FST
- 0.27mm dot pitch
- Non glare
- 1280 x 1024 @ 70Hz Max NI



UMA017

**\$679**

**UMAX®**

**Maxvision B7 Plus**

- 17 inch FST
- 0.25mm dot pitch
- Non glare dark glass
- 1600 x 1200 @ 87Hz Max NI
- Standby power switch



UMA018

**\$939**

**Daewoo**

**14 inch Monitor**



- 1431X Colour digital monitor
- 1024 x 768 resolution NI
- 0.28mm dot pitch
- non glare screen
- 3 year warranty

DAE002

**\$249**

\* Actual Products may vary from illustrations shown

**Daewoo**

**15 inch Monitor**



- 518B FST Colour digital monitor
- 1280 x 1024 resolution (at 60Hz)
- 0.28mm dot pitch,
- non glare anti static screen
- 20 mode memory
- 3 year warranty

DAE003

**\$319**

\* Actual Products may vary from illustrations shown

**Daewoo**

**17 inch Monitor**



- 1710B FST Colour digital monitor
- 1280 x 1024 resolution (at 60Hz)
- 0.28mm dot pitch,
- non glare anti static screen
- 20 mode memory
- 3 year warranty

DAE004

**\$599**

\* Actual Products may vary from illustrations shown

**Sony CPD-100ES**

This entry level 15" computer display (14" V15) provides features normally found on high-end Sony Computer displays, including:

- The crispness of Sony's legendary Trinitron CRT technology
- Easy-to-use on-screen controls for brightness/contrast/colour etc
- Vertically flat short-neck CRT design
- Digital Multiscan Technology supports multiple PC and Mac resolutions up to 1280 x 1024 @ 60Hz



SONY46

**\$499**

**Sony CPD-L150 TFT**

Uniquely designed for those environments where desktop space is valuable. With only a 6.5" depth and weighing in at 11.7 lbs., the L150 takes up 60% less desk space than a standard 17" CRT based display.

- Removable tilt base provides optional arm or wall mounting capability
- Digital FlexRes Technology - Sony's exclusive chipset design provides a crisp, clear full screen image regardless of resolution
- Bright Picture, Sharp Images - 300:1 contrast ratio, 200cd/m2 luminance and a tight 0.297mm dot pitch
- Digital Multiscan Technology - Wide horizontal scan range of 30-70kHz provides accurate resolutions from 640 x 480 up to 1024 x 768 @ 85Hz
- Full Color - Displays over 16 million colors
- Designed For Windows NT and Windows 98
- Macintosh compatible
- MPRII approved



SONY47

**\$3149**

**Panasonic 15" TFT LCD Display Monitor with Multimedia**

The new PanaFlat LC50S is an amazing achievement. Its space-saving, streamlined design measures less than 3" deep, but gives you a resolution and colour reproduction comparable to your typical CRT monitor.

- New Multimedia Bass Reflex Speakers and built in Microphone
- New USB port connectors
- Wide Display area comparable to conventional 17" CRT monitors
- Plug in compatible with CRT monitors
- Automatic Frequency Selection
- Automatic Pixel Converter for full screen display at all resolutions
- New A-Agras Coat for sharper images
- Advanced On Screen Display (OSD)
- High 1024 x 768 Resolution at 75Hz
- High resolution pixel pitch of 0.2975mm
- Windows 95/98 Plug & Play
- 3 Year RTB Warranty



PAN003

**\$2169**

For the cost of a local call **EXPRESS Orderline 1300 300 003**  
Sales Lines Open 8.30am 'til 7pm (EST) Monday to Friday and 10am 'til 3pm (EST) Saturday



### 3COM PALM III



Stay organised, wherever you go! Weighing in at an amazing 126 grams (approx 160 grams including the batteries) and measuring 12cm by 8cm by 2cm, the Palm III can:

- Store 6000 addresses
- 5 years of appointments
- 1500 to do items
- 1500 memos
- 200 emails

LIMITED STOCKS

USR051

**\$595**

ALSO AVAILABLE

3Com Palm IIIx

USR008

**\$719**

3Com Palm V

USR007

**\$889**



# ONE STOP COMPUTER SHOPPING

MODEMS MODEMS MODEMS MODEMS MODEMS MODEMS MODEMS



## Get Connected to the Net!

More connected.

### 3COM U.S. Robotics 56K\* Voice Faxmodem

Includes V.90 ITU 56K standard and x2 technology

Experience the Internet like never before! Grab graphics-rich Web pages, e-mail, huge data files, real-time sound and video faster, play intense games, get more done online. Compatible with both the V.90 ITU 56K standard and x2™ technology. Includes a CD-ROM jam-packed with great software for work and play. Visit [www.3com.com/56k](http://www.3com.com/56k) for a compatible Internet provider near you or call us on 1300 300 003.

#### Key Benefits:

- Number 1 selling modem in the world
- Brings you great Web sites faster
- Software upgradable for future enhancements



USR104

**\$219**

### 3COM U.S. Robotics 56K\* Faxmodem

Includes V.90 ITU 56K standard and x2™ technology

The world's most popular 56K Fax modem, lets you download much faster than V.34 modems do. You get 56K bps\* download capability and dual/mode performance with simultaneous support of the 56K/V90 International standard and legacy 56K bps x2 Technology.

\* Can receive at up to 56 Kbps, send at up to 31.2 Kbps. Due to FCC regulations, receiving speeds limited to 53 Kbps. Actual speeds may vary. Requires compatible phone line and server equipment.

Product may differ from that illustrated.



3C0054

**\$189**

#### ABC External

- Auto select - 56K flex/V.90
- 1300 help desk
- 5 years warranty
- Headset with microphone
- Web station software
- 100 hours Internet starter kit



External

ABC003

**\$99**

#### ABC Internal

- Auto Select - 56K flex/V.90
- Webstation software
- 100 hours Internet Starter Kit
- 1300 help desk
- 5 years warranty

#### ABC PC Card Modem

- Dual mode 56K flex/V.90
- Smart voltage
- Webstation software
- 1300 help desk
- 5 years warranty
- 100 hours Internet Starter Kit

Internal

ABC004

**\$79**

V.90 56K PCMCIA

ABC005

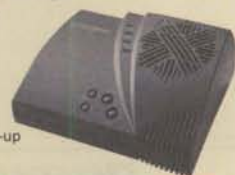
**\$159**

### 3Com U.S. Robotics 56K\* External Professional Message Modem

3Com's new range of 56Kbps V.90 standard desktop modems - the 3Com U.S. Robotics 56K V.90 External Professional Message Modem and 3Com U.S. Robotics 56K V.90 External Message Modem - enable users to meet all of their data, voice and message management needs with a single product, guaranteed to provide an enhanced and productive Internet experience.

#### Features:

- Faster Internet access
- Caller ID
- One-button access to voice messages
- Remote retrieval of voice messages through a dial-up connection
- Built-in high quality speakerphone
- V.80 (video conferencing) capable
- Easier installation and use
- Software upgradable for future enhancements
- Backed by a Lifetime Limited Warranty
- Valued-added Connections CD-ROM Software



USR105

**\$299**

### 3Com U.S. Robotics 56K\* External Message Modem

#### Features:

- Faster Internet access
- Remote retrieval of voice messages through a dial-up connection
- Software upgradable for future enhancements
- Backed by a Lifetime Limited Warranty
- Valued-added Connections CD-ROM Software
- Easier installation and use



USR106

**\$249**

### Little Devil USB - Devilishly Fast

- 56K Flex/V90. Auto Select
- Low power 3.3v (for notebook use)
- Compact Lightweight design (50gms)
- Toll free Australia wide help desk
- 5 years warranty
- Webstation Station
- 100 hours Internet Starter Kit

Little Devil USB

AUS535

**\$199**

Tasmanian Devil

AUS536

**\$179**

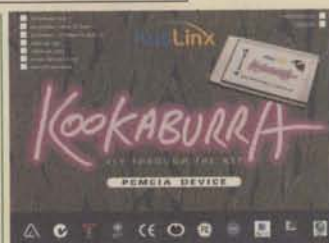
### Tasmanian Devil

- Auto select - 56K flex/V.90
- Rockwell chipset
- 1300 help desk
- 5 years warranty
- Headset with microphone



### Kookaburra 56K 10/100 Base Ethernet combo PC-card

- Dual mode 56K/flex V.90 modem
- 10/100 base ethernet card
- Simultaneous networking and fax modem operations
- PCMCIA Device
- 5 years warranty
- 100 hours Internet Starter Kit



Kookaburra

AUS537

**\$399**



The Brick

AUS538

**\$239**

#### The Brick

- Auto select - 56K flex/V.90
- Call back security
- Video conferencing, Fax modem
- Password protection
- Internet Alarm
- Headset with microphone
- In-built microphone
- Volume control dial
- 1300 help desk
- 5 years warranty
- 100 hours Internet Starter Kit



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## Banksia WaveSP 56

The fully featured 56,000bps modem!

The Wave SP is the first modem to be awarded a prestigious Australian Design Mark in recognition of design excellence and innovation. The assessment panel commented that "the Wave SP is radically different from its competitors and upholds the highest principles of unitary design".

Includes:

- High speed data transmission at 56,000bps (v.90 standard)
- Simultaneous voice & data (SVD) transmission
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- The best new games



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Banksia

BAN003

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## NetComm Roadster II 56 Voice, Fax Data Modems

Using the latest telephone exchange technology, the NetComm Roadster II 56 voice, fax, data modems deliver much greater speed. So now the World Wide Web is made much more exciting - with super fast downloading of graphics, games and multimedia. With Simultaneous Voice and Data (SVD) functionality, you can speak to the person you are sending data to at the same time, over the same telephone line, without having to make an additional call. While playing your favourite games, speak to and hear your competitors' reaction as you blast them away!

### Ultra

The Roadster II 56 Ultra's multipurpose speakerphone capability turns your PC into a hands free telephone (Speakerphone). Your computer can store all your phone numbers and dial with the click of a mouse button.

On the NetComm Communication CD you will find all you need to make the most of your modem including user guide communication software, drivers, cool games and much more.



NET147

**\$249**

### USB

The Roadster II 56 USB incorporates the latest serial bus technology known as USB (Universal Serial Bus). USB is an evolutionary step up from current serial ports, offering higher throughputs, TRUE Plug & Play and Auto Setup. It also does away with the need to use an external power supply, as the USB port of the computer now supplies the power to the modem directly.

Note: 56Kbps is a download speed only. 33.6 Kbps is the maximum upload speed. Download speed are subject of telecommunication carrier service.



NET028

**\$225**



## The Best Value in PC Power Protection

Computer users fall into two groups: those who have lost data due to power problems and those who are going to. The more you use your computer, the sooner you'll have to pay for that loss. Power problems wreak havoc on today's multitasking networked or stand-alone PCs. The more you do with your PC, the more you stand to lose.

**Back-UPS** Best value power protection for stand alone PCs

Features

- Compact design for desktop computers
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- Full-time EMV/RFI filters for noise filtration
- QuickSwap battery replacement system and Quick recharge
- User adjustable option switches allow you to save battery power
- Two year warranty and industry approvals
- Surge protected outlet for laser printers
- Communication interface port



actual product may vary from illustration.

APC Back-Ups 300 APC013

**\$179**

APC Back-Ups 500 APC021

**\$229**

APC Back-Ups 650 APC022

**\$295**

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Integrated solutions that guide you on the fast track to the most economical and dependable way of networking

### 10/100Mbps NWay Dual Speed Hubs

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8-port 10/100Mbps Dual Speed Hub with Switching. Stackable

- Unmanaged 8 port Nway Dual Speed Hub. Stackable up to 5 units or 40 ports.
- 8 x RJ45 ports to support CAT3,4,5 for 10Mbit connection, CAT5 for 100Mbit connection.
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DLK012 DFE-916X/N.....**\$1099**



DLK011

**\$349**

### Internet Server

DP-602

2 port Internet ready Server for SOHO Networks

- 1 x 10/100Mbps NWay Ethernet Port, 2 x RS-232 460kbs Com Ports.
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- Dual use of Com ports for double bandwidth. Support for Analog modem or BRI ISDN TA.
- Admin through Windows based program, Web browser and telnet.



DLK006

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## Ethernet Interface Adapter

DFE-530TX

PCI-bus 10/100M Fast Ethernet Network Interface Card

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driver for Netware, SCO Unix, Windows 95, Windows 98 and Windows NT.

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## Microsoft Office 2000 Training

**Work Smarter, Not Harder**

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Inserting text, moving the insertion point, using the arrow keys, using word wrap, using key combination shortcuts, removing text, formatting text, changing font, aligning text, using templates, setting margins, previewing, adjusting tabs, indentation and much more.
- **Excel 2000**  
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- **Access 2000**  
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- **Windows 95/98**  
Using menus/ shortcuts changing views, multi-tasking, working with Explorer, moving and copying files, placing programmes in the start-up menu, using a scroll bar.

- **Outlook 2000**  
Composing email, selecting profiles, formatting carbon/ blind carbon copies, attaching files, using preview pane, replying messages, identify message types, managing junk mail, grouping items on a timeline, sorting, storing/ organising messages and more.
- **Powerpoint 2000**  
Using templates, identifying window components, editing slides, navigating through views, deleting items, using AutoContent wizard, demoting/ promoting items, expanding/ collapsing slides, editing the slide master, rearranging slide order, inserting clip art, inserting charts, applying sound, animating text and more.
- **Internet Explorer 5**  
Examining desktop icons, launching internet explorer, screen elements, defining URL, opening a web page, entering an internet address, disabling the show pictures option, viewing/ discussing alternative text, using hyperlinks to navigate, changing the default homepage, viewing an offline homepage, discussing channels, adding active desktop items and more.

**NEW**



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## Teach Yourself CD Tutorial Range

### First Step 2000

The first step to learning to use a computer in the new millennium. This three in one package covers all the basics that you need to know to get up and running and to work more efficiently within the Windows 95/98 environment and with Word 2000 and Excel 2000. Learn to use Windows Explorer in Windows 95/98. Discover ways to use tool bars in Excel 2000. Learn how to insert items in Word 2000.



Includes:

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- Teach Yourself Word 2000
- Teach Yourself Excel 2000

VIA118

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### Web Page Publishing 2000

Learn all about HTML programming and get your information on the web faster and looking more professional. Learn to add backgrounds using FrontPage 2000, downloading an image using HTML, creating a web page with HTML code and shows how a HTML table created in Notepad converts to a web page.



Includes:

- Teach Yourself FrontPage 2000
- Learning HTML Vol 1
- Learning HTML Vol 2
- Learning HTML Vol 3

VIA119

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### Beyond Office 2000

A four in one training pack that covers all the Office 2000 non-core products. Learn how to add a contact in Outlook 2000, Scheduling, how to insert clipart into PhotoDraw 2000 and learn how to create custom colours in FrontPage 2000. Four great packages in one - great value.



Includes:

- Teach Yourself PhotoDraw 2000
- Teach Yourself Outlook 2000
- Teach Yourself Publisher 2000
- Teach Yourself FrontPage 2000

VIA110

**\$79**

## Teach Yourself Corel WP Office 2000

Get the most out of your software

Learn all the time savers of the new Corel WordPerfect Office 2000. This pack includes all the basics to get you up and running and more advanced features to help you work more efficiently. A complete set of 5 interactive multimedia CD tutorials in 1 package. Great training, great value.



Includes:

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VIA111

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## Microsoft OFFICE 2000 FAMILY

### What Productivity Means Today

Microsoft Office offers four unique sets of productivity tools to meet your business needs. Whether you choose Office Premium, Professional, Small Business, or Standard, you get everything you need to help you work more efficiently every day.

Office 2000 enables you to:

- Easily share information and work with others. Microsoft Office 2000 applications support HTML, so you can easily share your work with others, regardless of the software they use.
- Manage your day efficiently. Send and receive e-mail, coordinate schedules, and track activities with your contacts using the personal information management features in the Microsoft Outlook messaging and collaboration client.
- Make better business decisions. Use easy drag-and-drop tools to conduct rich, interactive analysis, and identify trends and opportunities graphically with Microsoft Excel PivotChart dynamic views.
- Streamline the way you work. Reduce down-time and improve reliability. Self-repairing applications search for missing or corrupted files, and repair them automatically so you don't have to.



Office 2000 Pro U/G  
MSS229

**\$505**

Office 2000 Pro  
MSS214

**\$865**



Office 2000 Premium U/G  
MSS221

**\$595**

Office 2000 Premium  
MSS215

**\$1159**



Office 2000 Standard U/G  
MSS220

**\$395**

Office 2000 Standard  
MSS217

**\$719**



Office 2000 Small Business U/G  
MSS223

**\$395**

Office 2000 Small Business  
MSS216

**\$719**

### Microsoft

	Premium	Professional	Small Business	Standard
Microsoft Word 2000	✓	✓	✓	✓
Microsoft Excel 2000	✓	✓	✓	✓
Microsoft Outlook	✓	✓	✓	✓
Microsoft Publisher	✓	✓	✓	
Microsoft Small Business Tools	✓	✓	✓	
Microsoft Access	✓	✓		
Microsoft PowerPoint	✓	✓		✓
Microsoft Frontpage	✓			
Microsoft PhotoDraw	✓			

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## Microsoft Visual Basic 6.0

Build powerful applications fast!

Microsoft Visual Basic 6.0 is the most productive tool for quickly creating fast business solutions.

With its Rapid Application Development (RAD) environment, developers can quickly create and deploy super-fast client/server applications - plus easily develop Web applications using familiar Visual Basic programming techniques.

Visual Basic is the leader in RAD with its visual user interface (UI) designer providing developers with intuitive drag-and-drop UI creation. No tool is more RAD, easier to design GUIs with, or has more commercially available third-party components, controls, and tools associated with it. Visual Basic has many pre-built components and fast creation of custom components that can be either client or server based.

With IntelliSense technology, you don't need to memorise commands or language syntax. Just type a portion of the word, and Visual Basic does the rest.

Visual Basic Pro6.0 U/G  
MSS059  
**\$415**

MSS058 Vis Basic Pro 6.0 .....\$799  
MSS060 Vis Basic Ent 6.0 .....\$2019  
MSS061 Vis Basic Ent 6.0 U/G .....\$1189

Visual Basic 6.0  
Standard Learning  
MSS057  
**\$159**



## Microsoft Visual C++ 6.0

Visual C++ 6.0 is the most productive C++ tool for optimised high-performance Windows and Internet development.

Nearly all contemporary world-class software, including the leading Web browsers, Internet servers, databases, and office productivity suites are built with the Microsoft Visual C++ development system.

It is also a tool of choice for creating scalable, multi-tier corporate applications where performance and reliability are critical.

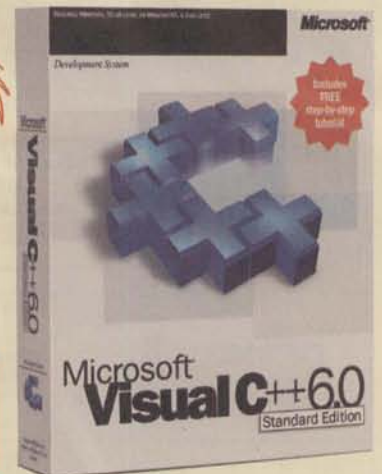
### Key Features

- For faster turnaround, make changes during your debugging session and continue on without rebuilding
- Speed development time and write less code with on-the-fly syntax and programming assistance within the editor
- Add a variable or method to a class, and its reflected immediately
- Realise up to a 30 percent faster compile time for quicker turnaround.



Visual C++ Standard 6.0  
MSS062  
**\$155**

MSS063 Visual C++ Pro 6.0 .....\$829  
MSS064 Visual C++ Pro 6.0 U/G .....\$415



## Microsoft Visual Studio 6.0

Everything you need to quickly build Web- and Windows-based solutions for your developing world.

Microsoft Visual Studio 6.0 provides you with a complete tools suite to build and manage distributed solutions. Take advantage of RAD features to increase your productivity, integrate data seamlessly into your applications, and organize team-based development projects.



Visual Studio Pro 6.0 U/G  
MSS054  
**\$859**

Visual Studio Pro 6.0  
MSS053  
**\$1699**

Visual Studio Ent 6.0  
MSS055  
**\$2575**

Visual Studio Ent 6.0 U/G  
MSS056  
**\$1699**

Product/Components	Description	Pro.	Ent.
Microsoft Visual Basic 6.0, Visual C++, Visual FoxPro 6.0, Visual InterDev 6.0, Visual J++ 6.0, MSDN Library Special Edition	The complete suite of Microsoft Visual Tools.	•	•
Enterprise Visual Database Tools	Visually design databases and views, and create and test stored procedures for Microsoft SQLServer 6.5+ and Oracle 7.0+ databases.		•
Microsoft BackOffice 4.5 Developer Edition (for Windows NT only)	Build Windows NT-based solution that can be accessed from Windows-based or Web-based clients and integrated in enterprise environment with selected server technologies form the Microsoft BackOffice family. The Development License for Microsoft BackOffice Server 4.5 includes Microsoft SQL Server, Microsoft Exchange, Microsoft SNA Server, Microsoft Site Server, Microsoft Systems Management Server and Windows NT Server.		•
Team Support	Microsoft Visual SourceSafe version control system version 6.0, Visual Component Manager, and Microsoft Repository.		•
Application Design Tools	Design multi-tier applications with Visual Modeler.		•



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## Microsoft Windows 98 Second Edition

Enhance your productivity and redefine your PC's possibilities using the Microsoft Windows 98 operation system. It provides full internet integration, optimal performance and support for the latest entertainment and accessory options.

Microsoft focused on advancing Windows 98 in the following areas with the release of Windows 98 Second Edition:

- Making it work better by enhancing hardware support and improving the initial PC user experience
- Delivering home networking capabilities through Internet Connection Sharing, which enables multiple users to seamlessly and securely access the Web at the same time, using a single shared Internet connection
- Delivering an improved online experience with Microsoft Internet Explorer 5 and Microsoft Windows NetMeeting conferencing software version 3, which provides users with a fast and easy way to use browsing and Internet conferencing software
- Advanced Configuration and Power Interface (ACPI) advancements deliver hardware optimisations and more granular control over settings on a device-class basis.
- USB Improvements include the capability to work with devices on a per-device rather than a per-port basis.
- WDM modem support supports USB modems and enables hardware vendors to write a single WDM modem driver for Windows 98 and Windows 2000 Professional.
- WebTV for Windows updates provide support for a broader array of tuner cards and help set the standard for the combination of high-bandwidth data and video.
- DirectX API 6.1 delivers a variety of improvements to Windows multimedia technologies, including better audio and video synchronisation.
- Processor and motherboard optimisations for the latest hardware technologies, including Intel Pentium III, are featured.
- Device Bay support enables a system to ship with Device Bay hardware.
- Windows 98 Service Pack 1 addresses issues with existing Windows 98 features and includes the Windows 98 year 2000 update and Internet Explorer 4.01 Service Pack 2.

### Key new features and enhancements:

- Internet Explorer 5, the new version of Microsoft's award-winning browser software, is included.
- Internet Connection Sharing enables multiple users to seamlessly and securely access the Web simultaneously via a shared Internet connection.
- NetMeeting conferencing software version 3, the new version of Microsoft's real-time collaboration and conferencing client, introduces a smarter user interface, data conferencing security, enhanced standards support and more.
- Enhanced 1394 support supports key controller interface protocols.
- High-bandwidth modem support delivers driver support for leading ADSL modems.



Microsoft Windows 98 2nd Edition U/G  
MIC771  
**ONLY \$139**

## Microsoft FrontPage 2000

Microsoft FrontPage 2000 gives users everything they need to easily create and manage great Web sites.

FrontPage 2000 was developed to take the best features of award-winning FrontPage 98, make them even easier than before, and add to them new features that customers have requested.

Organisations are demanding complete solutions that breathe life into static, one-way Web publishing systems and in turn, convert intranet and Internet sites into two-way collaborative environments for document creation and editing. Microsoft FrontPage 2000 helps make two-way Web sites a reality. FrontPage 2000 also integrates seamlessly with Microsoft Office 2000 so Office users can learn it quickly and network administrators can employ Office-related features during installation.



Microsoft FrontPage 2000  
MSS236  
**\$169**

Microsoft FrontPage 2000 U/G  
MSS245  
**\$85**

## Microsoft Publisher 2000

Microsoft Publisher 2000, business desktop publishing program, is designed to help business users easily create professional-looking marketing materials. A flexible wizard model allows users to work the way they want, and automated design expertise helps them achieve professional results without design expertise. Stronger Office integration and a complete print-to-Web publishing solution enable users to deliver professional-looking results.

### Includes:

- More than 400 new publication templates, including 10 new coordinated Design Sets for a total of more than 2000 professionally designed business templates.
- New Catalog Wizard for creating multi-page catalogs and booklets.
- New Quick Publication Wizard for creating quick single page publications.
- 15,000 high quality photos and clip art and the new Microsoft Clip Gallery.
- Plus much more...

Microsoft Publisher 2000  
MSS247  
**\$149**

Microsoft Publisher 2000 U/G  
MSS246  
**\$119**

## Microsoft Graphics Studio PhotoDraw 2000

Now business users can create professional-looking artwork to enhance their marketing materials without having any graphics design experience - Microsoft PhotoDraw combines powerful illustration and photo-editing in one easy-to-use program that works just like Microsoft Office.

### Includes:

- 20,000 pieces of clip art and high-quality backgrounds, and more than 300 professionally designed business templates for everything from business logos and flyers to Web buttons.
- 3-D and other special effects that can be added to any graphic, text, or photo, and preview the effects before applying them.
- Read files from CorelDRAW, Adobe Photoshop, and other graphics programs.



Microsoft PhotoDraw 2000  
MSS197  
**\$229**

## Microsoft Plus! 98

The ideal companion for Windows 98

Microsoft Plus! 98 is the ideal companion for Windows 98, with enhancements for work and play. It includes powerful system utilities, new themes and cool games.



Microsoft Plus! 98  
MIC761  
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## Microsoft Windows NT Workstation 4.0

Powerful Performance and Reliability

**Key Features:**

- ease of use
- secure, easy access to the internet and Corporate intranets
- improved network integration
- improved management features
- mobile computing
- multimedia and graphics improvements
- application programming interfaces and additional features



MS Windows NT Workstation 4.0 U/G  
MSS048

**\$225**

MS Windows NT Workstation 4.0  
MIC464

**\$469**

## Microsoft Windows NT Server 4.0

**Key Features:**

- lower operating costs
- leverage your existing systems
- globally manage users and security from a central location
- reduce communication costs by using a VPN to dial in via the Internet
- create professional-quality Web sites easily
- build and deploy powerful intranet applications quickly
- manage all Web sites across an entire network from a single location

MS Windows NT Server 4.0 +  
5 Client UG  
MIC583

**\$499**

MS Windows NT Server  
4.0 + 5 Client  
MIC463

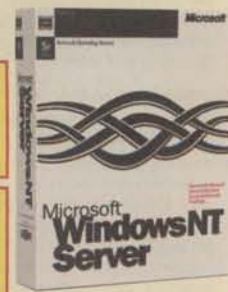
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MS Windows NT Server 4.0 +  
10 Client UG  
MIC493

**\$679**

MS Windows NT Server  
4.0 + 10 Client  
MIC495

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## Microsoft BackOffice Version 4.0

Microsoft BackOffice provides the integration, ease of use, scalability and manageability hitherto unavailable with traditional client server or Internet software. It provides the best foundation for a new class of solutions that combine the best of three-tier client server and Internet technologies allowing either thick client or thin client solutions to be used as appropriate.

Includes (boxes shown for display purposes only):



MS BackOffice Server 4.0  
MSS130

**\$3749**

MS BackOffice Server 4.0 Comp U/G  
MSS131

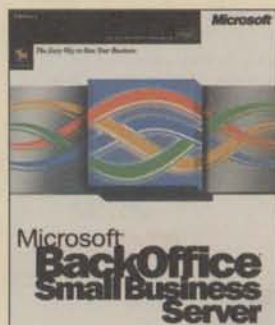
**\$3149**

MS BackOffice Server 4.0 Version U/G  
MSS132

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## Microsoft BackOffice Small Business Server

Microsoft BackOffice Small Business makes it easy to manage and grow your business and now with Microsoft Office 97 Pro you have the Complete Business Solution



File, print, and application services;

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- MS SQL Server provides a powerful, secure relational database for running business apps.
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- Installing MS Small Business Server is truly easy. Automated tools.
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BackOffice SBS 4.0 + Office 97  
Pro 5 Users Starter Kit  
MSS127

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Pro Additional 5 Client Licence  
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MSS072

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# ONE STOP COMPUTER SHOPPING

ACCOUNTS ACCOUNTS ACCOUNTS ACCOUNTS ACCOUNTS

## MYOB is Australia's favourite

- used by over 140,000 Australian businesses
- recommended by 2 out of 3 Australian Accountants
- Year 2000 compliant - see [www.myob.com.au](http://www.myob.com.au)



**BUY NOW AND GET A FREE GST UPGRADE!\***

\* offer valid for qualifying products purchased from 28 June 1999 until the release of the respective GST ready upgrades. Conditions Apply - call for full details.

## MYOB Accounting V8 MYOB Accounting With Payroll V8

MYOB Accounting Version 8 builds on all of MYOB's award-winning features and adds:

- MYOB OfficeLink direct link to MS Word and MS Excel.
- User-definable aging - choose 7-14-21 days or whatever you want. Plus correct monthly aging.
- Electronic payments via your bank & 27 other enhancements.

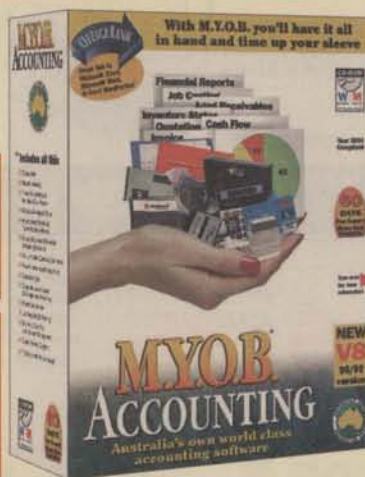
Features include: General Ledger, Chequebook, Sales & Receivables, Purchases & Payables and Full Inventory. MYOB Accounting with Payroll includes all of these features plus a fully integrated Payroll.

MYOB Accounting V8  
MYO030

**\$325**

MYOB Accounting V8  
with payroll  
MYO031

**\$475**



## MYOB Premier V2

Multi-user accounting that's as easy as MYOB

All the accounting features of MYOB Accounting with Payroll, plus additional features tuned for use across a network by multiple users. MYOB Premier brings the power, flexibility and award-winning ease-of-use of MYOB to multiple concurrent users. Includes access for 3 concurrent users - additional licences easily added.

### What's new in V2

#### Professional Time Billing

MYOB Premier is now even more powerful with the inclusion of a heavy-duty professional time billing module. MYOB's time billing function is just right for professionals such as consultants, lawyers, accountants, architects, graphic designers and anyone who bills by the time they spend with a client or on a project.

#### Enhanced Inventory

Now more powerful than ever with breakthrough features including:

- Multiple pricing levels - for a single product easily set prices for retail, wholesale or any of 5 levels
- 5 years of item sales history
- New user-definable fields - keep track of colours, styles or anything else you wish



**NOW WITH  
PROFESSIONAL  
TIME BILLING**

**MULTIUSER**



MYOB Premier V2  
MYO013

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## MYOB FirstAccounts

Your ideal first accounting system, MYOB FirstAccounts makes it easy for you to track income and expenditure, reconcile bank statements, create and print invoices, statements, and purchase orders, track who owes you money and who you owe money to

Produce profit & loss and other key reports with a mouse click. No business is too small for FirstAccounts. Outgrown Quicken, MS-Money? You can easily move up to MYOB FirstAccounts.

MYOB FirstAccounts  
MYO025

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## MYOB ASSET MANAGER

Do you know how much money you have invested in fixed assets? Do you know where they are? Can you quickly provide a list of assets to the insurance company? Are you keeping depreciation schedules and asset cost information the ATO requires? If not, you need MYOB Asset Manager.

MYO003 **\$249**

Y2K compliant



## MYOB POWERPAY

Powerpay can process payroll in minutes. Designed for companies with more than 20 employees, Powerpay is quick and easy to set up. Using a prompting system, it guides you through setting up the details for each employee. It even comes with 60 days free introductory support.

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## WristGliders™



## What are WristGliders?

WristGliders™ are a revolutionary ergonomic wrist support which can minimise or eliminate the effects of R.S.I. The cushioned circular vinyl platforms glide independently with each hand to provide comfort, flexibility, and proper wrist alignment while using the keyboard and mouse.

WristGliders™ deliver the kind of constant, uninterrupted support medical professionals recommend, and are proven to reduce the stress in your back, shoulders, neck, and arms. With WristGliders™, you'll work relaxed and be more productive than ever before.



Wristgliders 3-pack  
(2 Keyboard, 1 Mouse)

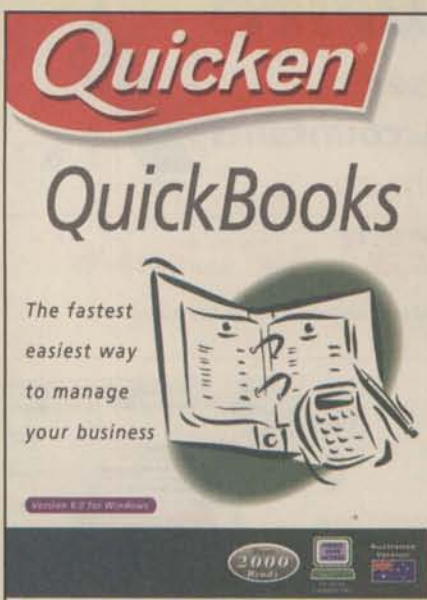
CHK018.....\$29

Wristgliders single pack

CHK019.....\$15



# QuickBooks V6



### Increased efficiency

- Pop-up date calendar on date-fields.
- Ability to sort registers in 5 different ways (eg. can arrange information by dollar amount, document number, order entered, date and order entered).
- Benefits from 32-bit optimised performance, including right mouse-click functionality.
- Improved help file - "How do I" menu button that makes searching for help instructions quicker and easier.
- Ability to directly specify the next cheque numbers when paying bills without having to return to the register.

### Easier to Work with Your Accountant

- Users can now associate a tax line with each account providing the ability to create tax reports in QuickBooks to assist in completion of the tax return. The reports show the amounts to fill in for each tax line on the tax return.

### Increased Report Functionality

- Retains report orientation so that when you enter for it to be in portrait or landscape it remembers this next time you want to print it out.
- Unbilled costs by job. Allows users to quickly see any outstanding expenses not yet charged back to customers. This report helps ensure reimbursement in a timely manner for expenses incurred.

### Customising Company Information

- Ability to record the ACN or ARBN in a specific field so it appears on sales and purchase orders and reports.

**FREE GST  
UPGRADE!\***  
**FOR  
QuickBooks  
V6**

\* Conditions apply. Offer valid to product purchased from V6 Launch date till release of GST ready version. Call for full details

QUI150  
**\$175**

QuickBooks is the easy to learn and use, flexible, comprehensive and integrated accounting and financial management software package for small to medium size enterprises.

System requirements: Win 95, 98 or NT Platforms

QUI147 QuickBooks V6 Tech Upgrade .....	<b>\$89</b>
QUI148 QuickBooks Pro V6 .....	<b>\$309</b>
QUI149 QuickBooks Pro V6 Tech Upgrade.....	<b>\$149</b>
QUI140 Quicken V7 .....	<b>\$75</b>
QUI141 Quicken Deluxe V7 .....	<b>\$89</b>
QUI142 Quicken For Business V7 .....	<b>\$135</b>

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Software Awards  
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### FEATURES

- ✓ Low price - only a fraction of consultant's fees
- ✓ Covers all relevant clauses of ISO 9001/2
- ✓ Works with your familiar word-processor
- ✓ Work at your own pace

CD Format

(Professional licences and 3.5 Disk version also available)

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TQA004  
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ESSENTIAL BUSINESS  
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TQA003**  
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LAST**

**Manage your quality system without bulging filing cabinets**

## TQA Quality Manager

### ✓ Document & Data Control

Master List To track important documents and data. Records display number, title, version & issue date. Links to leading Windows word processors to view documents. With network licence, documents may be distributed electronically. Also includes Copy Holders List, Revisions List & Deletions List

### ✓ Internal Quality Audits

Audit Schedule to plan your audit program, and identify outstanding audits. Generate Audit Reports online. Duplicate Schedule reproduces checklists and other details for future years. List Internal Auditors, their contact details, and audits.

### Nonconformances/Corrective Action

Nonconformance List displays summary and outline of all reported nonconformances. Generate Nonconformance Reports online. Various Query facilities.

### ✓ Management Review

Record Minutes of Meetings. Default agenda and facility to create custom agenda.

CD Format

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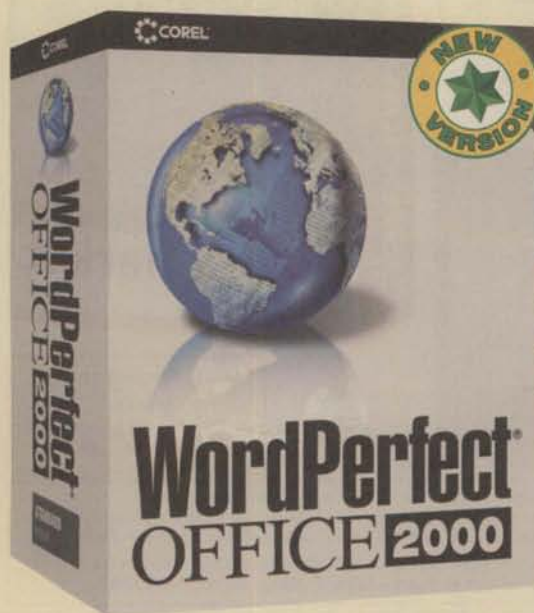
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It's all about getting the job done right, with suite-wide integration, you can combine text, graphics and charts in one document. WordPerfect Office 2000. today's office solution.



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### WordPerfect Office 2000

**WordPerfect 9** - Professional word processor, create outstanding documents, such as newsletters, reports, brochures, add graphics, charts and tables with ease. Enhanced Microsoft conversion capabilities. Corel RealTime Preview lets you preview formatting before applying it to your documents.

**Quattro Pro 9** - Turn numbers into meaningful information with this powerful spreadsheet program. Organise, analyse, report, manage and share data quickly. Increased notebook size now supports up to one million rows, giving you greater flexibility when converting Microsoft Excel files. Enhanced Microsoft Excel conversion capabilities.

**Corel Presentations 9** - Create captivating, high-quality slide shows and drawings that leave a lasting impression with this dynamic presentations application. Enhanced Microsoft PowerPoint import/export capabilities. Redesigned Internet Publisher gives you step-by-step instructions on publishing a slide show to the Web.

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**Trellix 2** - Quickly organise documents and publish them to the Web without knowing HTML. Increase the availability of information throughout a corporation and reduce the workload by delegating content ownership to specific individuals.

### WordPerfect Office 2000 Voice-Powered Edition

Includes all the applications in Office 2000 plus

**Philips FreeSpeech 2000**

- Use the power of your voice to create, edit and format documents in WordPerfect 9. Philips FreeSpeech 2000 uses High Speed, High Accuracy technology to dramatically improve recognition rates
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- Voice-enhanced word processing means users can watch their words appear on screen as they speak to their computer at a normal pace up to 160 wpm

Also available:

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Features

- Intuitive word processing
- Integrated internet publisher
- 90+ spreadsheet functions in tables
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Plus

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- 90+ ExpressDocs
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COR546

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COR547

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COR549

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Yourself  
**WordPerfect  
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Get the most out  
of your software



Learn all the time savers of the new Corel WordPerfect Office 2000, includes all the basics to get you up and running and more advanced features to help you work more efficiently. Five interactive multimedia CD tutorials in 1 package.

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## MAUS Stockmarket Plus

### Easy Start Sharemarket Software

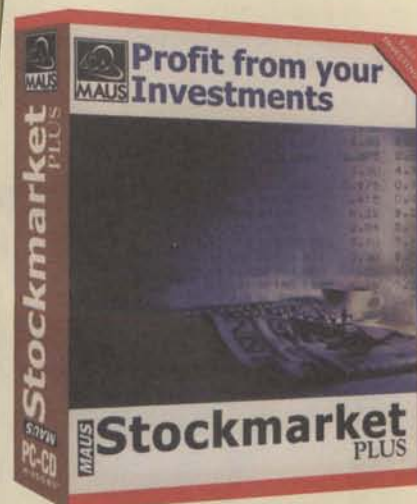
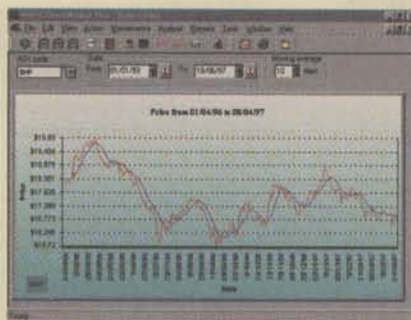
Over 5.5 million Australians are now investing in the stock market....grab your slice of the action!

#### 3 Great Reasons to Choose MAUS Stockmarket Plus

- 1 Portfolio Manager - Records every aspect of your share portfolio you'll ever need in an easily accessible format.
- 2 Charting & Query Tools - Pinpoint new and exciting investment opportunities using the user friendly charting and query functions.
- 3 Instant Tax Reports - Save literally hours of frustration at tax time using the automatically generated Australian Tax Reports.

#### Key Benefits

- Professional investment advice in simple English
- Manage stocks, personal finances, property, etc
- Track investments in any ASX listed company
- Download stock prices for fast, accurate analysis



MAUS Stockmarket Plus  
MAU007  
**\$179**

MAUS Stockmarket Plus...."is ideal for both novice and experienced investors who require a package to keep track of their stockmarket investments.... Seldom does a software package completely outclass competitors, offering users a clearly superior product in terms of sophistication, simplicity and obvious attention to detail"

MAUS Stockmarket Plus...."is specifically designed for monitoring a share portfolio and has the added advantage of providing analytical tools as well as keeping the records you need"

Review of core software - Personal Investment Magazine, 1997  
Review of core software - Editor of Money Section (SMH 17/9/97)

## Business & Marketing Plans

### The Easy Way

MAUS MasterPlan is designed for people who need a winning, professional Business Plan instantly. A step-by-step question and answer format enables you to construct full financials, text and graphics at the click of a button. MAUS MasterPlan will allow you to analyse and develop your business.

Topics covered include Sales Analysis, Market Analysis, SWOT Analysis, Marketing Plan, Financial Plan, and much more. Australian written and tested in the field, this program has been tailored specifically to meet the needs of Australian users and is suitable for both product and service businesses in any industry. With MAUS MasterPlan, your Business Plans will be more effective, more impressive, and greatly improve your chance of achieving success!

#### Product Summary

MAUS MasterPlan - Level 2 (Professional): Software to help you prepare either a simple Business Plan or a more detailed Business Plan which incorporates a full Marketing Plan and analysis. Includes full financial analysis, a follow up program which doubles as a Time Management tool and a FREE Business Planning workbook. Suitable for loan applications, analysing and improving an existing business, launching new products, or starting a new business.

#### Key Benefits

- Creates Business & Marketing Plans
- Suitable for business people of all levels
- Creates full financials & graphs
- Includes a simple step-by-step tutorial

#### WHAT THE PRESS ARE SAYING

"The brilliance of this system is that you're led through the entire process step by step... the results will be as good as anything a professional would have provided for you"

Your Computer Magazine

000000 6/6 Overall  
PC @uthority (January 1999)



Runs on Windows 3.1  
or later

MAUS MasterPlan for Windows - Level 2  
Professional  
(2 in 1 Business & Marketing Planner)

AUS501  
**\$169**

## MAUS Consultant's Pack

### Establish a Business Planning Consultancy

Used by 1000's of Accountants and Consultants, the MAUS Consultant's Pack will give you the forms, tools and know-how to establish a successful Business Planning Consultancy overnight. Includes information on setting up your consultancy service, promoting and costing your services, impressing your clients and a step-by-step guide for every assignment. Software contains over 80 pages of forms and management question checklists, overheads for training, sample proposals, press releases, advertisements and much more!

#### Includes

- MAUS MasterPlan Professional
- Consultant's Guide to Business Planning
- Special Consultancy Software
- Questionnaires for clients
- Training Manual



Used by 1000's  
of accountants and  
Consultants

MAUS Consultant's Pack  
(inc MAUS Master Plan  
Professional)

MAU003  
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## MAUS Employee Manual

### Create a Customised Employee Manual!

MAUS Employee Manual is the simplest way to create a handbook encompassing all of your organisation's employee policies and procedures. It comes complete with sample policies that you can use, in addition to all the important forms you may need.

The program's unique step-by-step process will ensure that your business has its own customised manual, protecting it from all-too-common litigation in areas such as Unfair Dismissal and Sexual Harassment. Protect your business today!

- **Helps fulfil your legal obligations.**
- **A Step-by-step Questions & Answers format.**
- **Comes complete with over 70 policies, procedures and forms.**
- **Improve productivity and motivation amongst all employees.**
- **No expensive consulting, royalty or commission fees.**
- **Publish your manual in hard copy and on your network or intranet.**

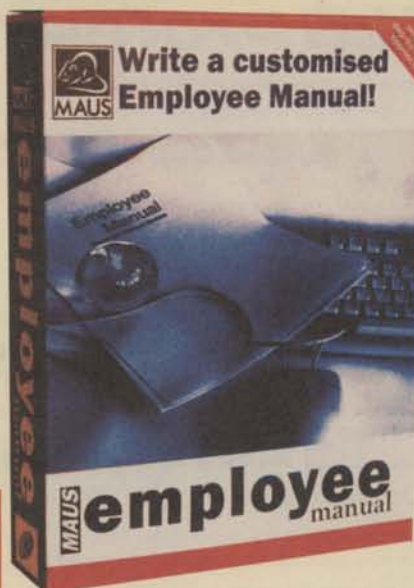
#### Policies Included

- Overtime Policy
- EEO
- Sexual Harassment
- Wages & Salary
- Sickness Benefits

#### Maternity Leave

- Employment Conditions
- Annual Leave
- Anti-Discrimination
- Termination

MAUS Employee Manual  
MAU011  
**\$179**



## MAUS Job Descriptions

### Write job descriptions in minutes!

MAUS Job Descriptions will help you create clear, concise job descriptions in minutes! Simply choose from the thousands of built-in jobs and edit or even combine duties from different jobs. Next, use the simple question and answer approach to address the physical and educational requirements, work environment, qualifications and supervisory responsibilities.

MAUS Job Descriptions will then take your answers and write a comprehensive job description that's fully customised to your organisation...

#### Key Benefits

- Create job descriptions in minutes
- Over 3,500 sample job descriptions to choose from
- Hire the right people
- Improve productivity
- Protect your organisation against unfair dismissal claims

MAUS Job Descriptions  
MAU005  
**\$169**



#### WHAT THE PRESS ARE SAYING:

"Job Descriptions offers 3,500 professional descriptions and Performance Review gives a list to follow when judging staff performance."  
Sydney Morning Herald (18<sup>th</sup> August 1998)

"...ideally designed to be used in conjunction with job interviews, HR planning and annual staff reviews"  
The Age (25<sup>th</sup> August 1998)

"...simple, affordable, revolutionary"  
Instore Magazine (September 1998)

★★★★★  
6/6 Value for Money  
PC @authority (October 1998)



**SAVE \$30**

## MAUS Performance Review

### For fast, effective employee appraisals!

Described by PC @authority as "one of the first products any manager should load onto their PC", MAUS Performance Review will help you create accurate, personalised employee reviews in minutes!

Simply choose from the dozens of performance criteria such as initiative, leadership, problem solving ability, and sales skills....to name just a few! Next, use the simple 1 - 5 grading system to rank your employees in each area.

MAUS Performance Review will then support your ratings with clear, effective text...

#### Key Benefits

- Save 50-90% of the time to write employee reviews
- Simple step-by-step approach
- Record ongoing problems and achievements
- Accurate, personalised reviews
- Clear, natural text flows

MAUS Performance Review  
MAU004  
**\$169**

...It's that fast. It's that easy!

## MAUS Debt Collector

### The easy approach to debt collection

MAUS Debt Collector is a complete debt collection system which automatically mail merges reminder and demand letters, reminds you of phone calls and action to take, and prompts you step-by-step through the entire debt collection process. To monitor your success, this revolutionary new product includes a unique graphing and reporting feature to quickly assess your current debtor position.

MAUS Debt Collector  
MAU009  
**\$179**

#### KEY BENEFITS

- Automatically sends 30, 60 and 90 day reminder letters
- Stand alone contact manager stores all debtor details
- Includes professional letters, legal documents & advice
- Reduce bad debts
- Cut collection time and costs



#### PRICE PLEDGE



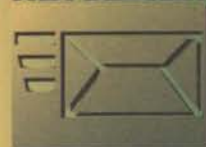
We will not be beaten on price!  
See page 47 for Terms & Conditions

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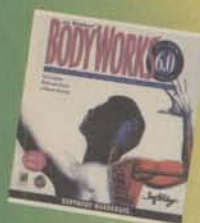
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## BODYWORKS v6

Whether you are looking for an in depth answer to a question, or just want to learn more about the human body - Bodyworks is the most informative and educational way to do it.

Includes:

- More than 80 rotating 3D models with audio
- Powerful search capabilities for over 400,000 words of text
- Web site directory and one button Internet access to current medical information

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## Visio Professional 5.0

*For the IT experts!*

### Cross-Functional Uses for IS/IT Professionals

Whether your IS/IT specialty is networks, databases, or software, Visio Professional gives you the tools to do your job and to exchange information effectively with other IS/IT personnel.

- Network diagramming and documentation.
- Software diagramming and documentation.
- Database diagramming and documentation.
- Share and exchange information.

### A Fully Customizable Development Platform

Different jobs require different capabilities. That's why we allow you to customise virtually every aspect of Visio Professional:

- Create custom shapes.
- Integrate Visio Professional into a custom solution.
- Add ActiveX controls.
- Tap our developer resources.

**Visio Professional 5.0  
VIS106**

**\$615**

**Visio Professional 10 user license  
VIS105**

**\$5279**

**Visio Professional Upgrade  
VIS104**

**\$315**



## Visio Enterprise 5.0

**Design and Model Your Enterprise Information Architecture**

Visio Enterprise is the ideal tool for designing and documenting networks, modelling and designing databases, and modelling software applications across an enterprise information infrastructure.

- Streamline the design and documentation of LANs, WANs, wiring closets, and directory structures.
- Guided Updating feature helps keep diagrams current as your network changes.
- Create customizable reports, generate and edit DDL scripts, and freely switch among multiple entity relationship notations.
- Built-in SNMP-based network AutoDiscovery technology and Guided Diagramming capabilities produce diagrams of logical and physical topologies.
- 14,000 exact-replica, vendor-specific device shapes represent your entire network in complete detail.
- Design and re-engineer databases from IBM, Informix, Microsoft, Oracle, and other leading vendors.
- Synchronize models with databases using a unique three-way comparison that detects changes made to the database since the last model-database update.

**Visio Enterprise 5.0  
VIS115**

**\$1549**

**Visio Enterprise 5.0 Upgrade  
VIS116**

**\$1099**



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**Work more productively using IntelliCAD**

*The smart new choice for CAD Professionals*

Modify multiple selected entities with the right-mouse button. Use the innovative Drawing Explorer to preview blocks of copy and paste layers, linetypes, styles, and more among multiple open drawings (MDI). Customise toolbars, menus, and keyboard shortcuts with a few mouse clicks. Even produce photorealistic 3-D designs using the 3-D drawing and rendering tools.

IntelliCAD 98 by Visio Corporation is the smart, new choice for CAD professionals. It offers unparalleled Autodesk AutoCAD compatibility, smooth Microsoft Windows integration, and numerous productivity features that streamline your work.

Like AutoCAD, IntelliCAD uses the DWG file format as its native format, so you can open V2.5-R14 files without conversion. If you've spent years learning AutoCAD commands, you'll feel at home in IntelliCAD, which fully supports an AutoCAD-compatible command line.

IntelliCAD works with thousands of Autodesk AutoLISP programs, and it runs custom ADS-based programs-whether developed in-house or by a third party, such as Ketiv Technologies, Eagle Point Software, or Hitachi-after a recompile. The result: you can start working immediately, using existing AutoCAD files, commands, and tools.

### Features

- Unparalleled AutoDesk AutoCAD compatible.
- Smooth Microsoft Windows integration.
- Runs custom ADS based programs.
- Includes innovative Drawing Explorer.

**Visio IntelliCAD 98  
Upgrade  
VIS118**

**\$259**



**Visio IntelliCAD 98  
VIS111**

**\$615**

## Standard 5.0

**The smartest way to create all your business diagrams**

- Visualise information stored and distributed in databases and spreadsheets.
- Avoid complex and time-consuming analysis of data and figures.
- Easily build and share your business diagrams with Microsoft Compatibility.
- Drag and drop your diagrams into any OLE compliant word processor, presentation package, spreadsheet or other software.
- Built-in support for Internet/Intranet standards (HTML and ActiveX) and document management standards ODMA.



**Visio 5.0 Upgrade  
VIS100**

**\$159**

**Visio 5.0 10 user license pack  
VIS101**

**\$2599**

**Visio 5.0 Standard  
VIS099**

**\$315**

## Technical 5.0

**Create & share technical drawings**

- 1. Fast** - Its drag-and-drop drawing style and intuitive work environment enables users to quickly produce high-quality technical diagrams with little or no training.
- 2. Intelligent** - Every SmartShapes symbol can store a unique set of data and is programmed to behave like its real-world counterpart.
- 3. Compatible** - With built-in CAD integration you can read and write files in popular CAD formats, and even convert static CAD symbols into dynamic Visio Technical shapes.

Simply choose from the included library of more than 4,000 expert-designed, industry-specific symbols, then drag and drop the shapes you need onto the drawing page to assemble technical diagrams in record time.



**Visio Technical Upgrade  
VIS102**

**\$325**

**Visio Technical 10 user license pack  
VIS103**

**\$5339**

**Visio Technical 5.0  
VIS107**

**\$625**





# ONE STOP COMPUTER SHOPPING

CAD CAD CAD CAD CAD CAD CAD CAD CAD CAD CAD CAD CAD CAD CAD

## AutoCAD LT 98

The award-winning AutoCAD just got better!

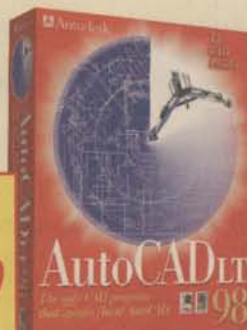
New AutoCAD LT 98 was designed to make your job a little easier! AutoCAD LT 98 is the only affordable, easy-to-use 2D drafting solution that offers superior performance, speed, reliability and seamless integration with AutoCAD software. A proven favourite in the affordable 2D CAD category, AutoCAD LT software has been ranked #1 in new and total unit sales for the last three years in a row and boasts more than 800,000 users worldwide.

- A visual, intuitive interface makes AutoCAD LT 98 easy to learn, use and remember.
- Quick, precision drawing tools ensure professional drawing productivity.
- Innovative online help and self-paced multimedia tutorials ensure fast product learnability.
- Because it's part of the Autodesk family of products, AutoCAD LT 98 is the only low-cost, 2-D drafting program that's 100 percent compatible with all the innovations in AutoCAD.

**FREE\***  
Logitech Mouseman  
Plus  
(4 button mouse)  
**WORTH \$129 rrp**  
\* While stocks last

Autocad LT 98  
QUI051

**\$759**



## Actrix Technical

The Simply Smarter way to diagram

Actrix Technical is a 2D diagramming tool that provides a truly automated drawing environment for easily creating a full range of dynamic drawings, from facilities plans to technical schematics to business diagrams.

### Easy to Use

Actrix Technical software establishes a new standard for intuitiveness and simplicity. Just select the template that suits your task and browse the catalogues you're shown. Then drag and drop the ActiveShapes objects you need into your diagram or drawing. You can even directly manipulate them on-screen.

### Intelligent, Discipline-Specific, ActiveShapes

Drag intelligent ActiveShapes into place and they automatically snap, align, and rotate precisely into position. Handle-based, dynamic editing means you can reshape them on the fly. For real-world accuracy and

industry compliance, thousands of ActiveShapes objects have been developed by industry experts and are included with Actrix Technical software.

### Superior AutoCAD Interoperability

You can import a detailed AutoCAD drawing as a background, and ActiveShapes automatically snap and align precisely to its geometry. Actrix Technical can read and write AutoCAD drawings, and it lets you reuse AutoCAD blocks in your diagrams.



AUT056

**\$499**



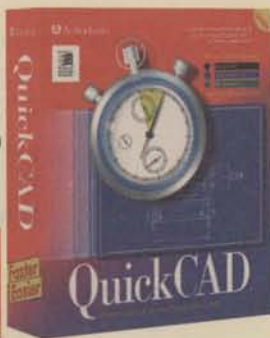
## QuickCAD

Faster, easier, and most affordable CAD!

QuickCAD Millennium Edition is the faster, easier, most affordable CAD software, whether you're a first-time user or an expert. A three-level interface prompts you to choose your level of experience - Beginner, Advanced, or Expert - to easily create any technical drawing. Other features include QuickHatch, AutoArray, Jump Snap, Guidelines, Realtime Pan and Zoom and compatibility with most popular CAD programs. In addition, QuickCAD software's DWF export allows you to publish your drawings on the Web. QuickCAD Millennium Edition offers features and performance to allow you to become more productive even faster.

AUT040

**\$75**



Three Level  
Interface:

Expert, Advanced,  
Beginner

Work at Your own  
Experience Level!

## AutoSketch 6.0

Spend Time Drawing - Not Learning Software!

An affordable and easy-to-use precision drawing tool for new or occasional CAD users who need to create conceptual drawings and sketches. AutoSketch 6.0 provides productivity and ease of use features not found in other low cost precision drawing programs.

Other features include 3-D Effects to add more impact to conceptual drawings, proposals and presentations; customisable grids; in-place OLE editing and the ability to import/export DWG files. Compatible with Microsoft Windows 98, 95 and NT.

- Drawing Guides
- Automatic Snap
- Spell Check
- Dynamic Pan & Zoom
- AutoArray
- Detail View
- Construction Lines
- Advanced tools for easier wall placement
- Hyperlinks

AutoSketch 6.0  
QUI052

**\$169**



## Educational & Upgrades

**\$100**  
cash back on  
AutoCAD LT98  
Upgrade\*

QUI053 AutoCAD LT 98 U/G

**\$349**

AUT108 AutoCAD R14 Student Ed

**\$375**

AUT025 AutoSketch 6.0 U/G

**\$119**

AUT106 AutoSketch 6.0 Institution Ed

**\$89**

AUT107 AutoSketch 6.0 U/G Institution Ed

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\* Limited Offer. Conditions Apply



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for details.



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Kick your project off by browsing the Interactive Multimedia Home Designs Encyclopedia from HomeStyles. Whether you are looking for a two-story Tudor or an expansive ranch house, the sheer range of top quality designs are sure to inspire. We've even included 150 editable plans to get you started! "FloorPlan highlights just how incredibly powerful and affordable professional-level CAD programs have become" PC Review, February 1998.

- Lightscape Technology
- FloorPlan 3D
- 3D Garden Designer
- HomeStyles Home Design Encyclopedia
- TurboProject Express

- Home & Office Symbols
- Unlimited database expandability
- Same document floor levels
- Interactive multi-run stairs
- Automatic creation of opening for stairs

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IMS132

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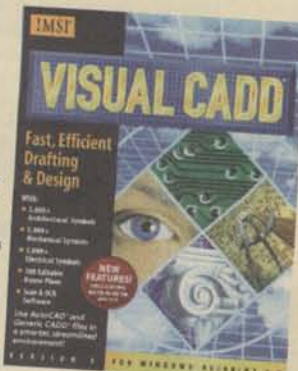
IM5147 TurboCAD V6 Professional ..... **\$535**

TurboCAD V6  
IMS146

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**\$535**

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IMS150

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# ONE STOP COMPUTER SHOPPING

GRAPHICS GRAPHICS GRAPHICS GRAPHICS GRAPHICS

## Adobe Internet Pack

All the Internet creation tools you'll ever need in the one box

This unbelievable integrated package, includes FOUR Adobe Web products in one box for a special price. You can design Web pages without having to know HTML, quickly optimise images for the Web, add special effects to your images and create buttons, navigation bars, banners and more.

Perfect for home users, Small to Medium Enterprises, Graphic Producers and SOHO.

The Adobe Internet Pack includes full working versions of the following Adobe products:

- ImageReady 1.0,
- ImageStyle 1,
- PageMill 3.0,
- PhotoDeluxe 2.0



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EDUCATIONAL  
pricing  
AVAILABLE

Windows  
ADO192

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## Adobe Acrobat 4

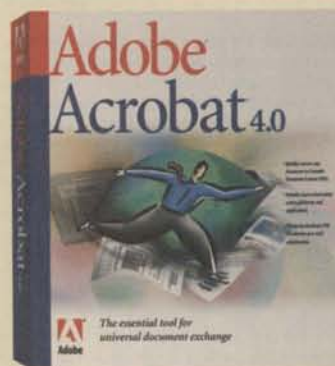
The Essential Tool for Universal Document Exchange  
"It's like you deliver the document yourself"

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Adobe Acrobat 4.0 offers:

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- Productivity - Quickly creating and delivering PDF files that everyone can view, distributing them electronically for comments and approvals, and efficiently publishing them in any medium replaces an often cumbersome, time-consuming, paper-based workflow.
- Accessibility - PDF files can be distributed in print, on the Web, on corporate servers, attached to e-mail, or on CD-ROM.
- Reliability - PDF files contain all the fonts, images, colors, and formatting data to display online and print on paper exactly the same, every time.

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[www.pacific.adobe.com](http://www.pacific.adobe.com)



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Windows  
ADO178

**\$399**

## Adobe Publishing Collection

The complete package for the creation, assembly and delivery of printed & electronic documents



If you have to choose one box - Choose This One!

The Adobe Publishing Collection for Windows and Mac brings together the latest versions of six of the World's leading graphic software packages all in one box. But not only do they come as one - they work as one.

Drag and drop features lets users move effortlessly between programs, ensuring a seamless workflow - whether for print, multimedia or online. The Adobe Publishing Collection comes at a fraction of the price of buying Adobe software separately and we're sure you will agree that choosing the Adobe Publishing Collection is a 'No Contest' decision. A comprehensive and cost-effective way for users such as graphic artists to business professionals to start publishing. Included in the one package are the following Adobe packages:

- Adobe PageMaker 6.5
- Adobe Photoshop 5.0
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- Adobe Illustrator 8.0
- Adobe Acrobat 3.0
- Adobe Dimensions 3.0



Adobe Publishing Collection

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ADO130

**\$1749**

Mac  
ADO131

**\$1749**

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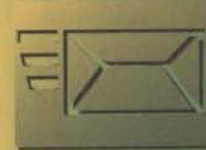
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## Office Advantage

**The Professional Way to Communicate**  
**The Premier Plug-in for Microsoft PowerPoint and Excel**

Office Advantage helps you effectively comprehend and communicate information. It brings clarity to 2D and 3D Excel charts and automatically improves the fidelity, navigation and playback of PowerPoint presentations. The result is the professional way to communicate on screen, in print or on the Internet.

- Create professional presentations in minutes!
- Add a voice track and deliver the message even when you can't be there
- Distribute your presentations via email or the Web
- Connect your ideas with professional film transitions
- Highlight critical information with eye-catching 2D and 3D charts

MET030

**\$225**

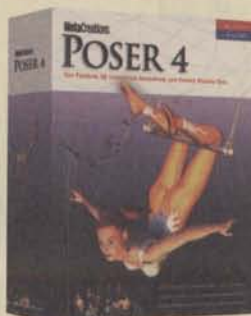


## Poser 4

**The Premier 3D Character Animation and Figure Design Tool**

Animate a 3D actor to tell your story. Create an electronic comic book with dinosaurs, people or futuristic robots, all interacting on stage. Special effects companies use expensive, complex 3D-Character animation tools for their film projects. Now, you can harness the power of 3D-Character animation. We make it fast, easy and affordable.

Poser is simple to use, even for the first time 3D user. The interface is designed to provide instant access and easy control of sophisticated character animation tools. Shaded, textured and fully interactive real time previews of your 3D figures allow fast posing and animating. Poser 3's figures are positioned and key framed to create custom poses and animations. Add lights, cameras and posed figures, then render images and movies for web, video, architectural projects, games and stories.



MET035

**\$409**

New Features Include:

- Redesigned UI
- Improved human figures with added resolution
- New animal figures
- Swappable 3D clothes wardrobe
- Bendable props
- New morph targets to generate unique characters
- Infinite lights
- Point At functionality
- Sketch Design rendering mode
- Hierarchical selection controls
- Polygonal grouping/picking tools
- Automatic hierarchical figure creation
- New Walk Designer animations
- 2nd CD with extra textures, sounds, motion files, morphs, props, utilities and samples
- Includes bundled version of Painter 3D



## Bryce 4

**MetaCreations**  
The Visual Computing Software Company

Bryce 4 is dedicated to designing, rendering and animating breathtaking natural 3D worlds and abstract 3D sculptures. Bryce is the perfect application for beginners and advanced users, because it comes loaded with libraries of presets to use in your own work. As you become more proficient, Bryce allows you to easily create your own surface materials, skies and more-Bryce actually grows with you!

- Textured terrain export through real-time multi-resolution Export Lab
- Interactive movie previewing system
- Extensive collection of importers/exporters for increased interaction
- Create stunning skies with the tools available in the Sky Lab
- Use Bryce to build content for the Web, using a variety of authoring tools
- Hundreds of megabytes of content to explore!

Bryce 4 U/G

MET033

**\$259**

MET032

**\$485**



## Headline Studio

Headline Studio 1.0 brings broadcast-quality graphics to the Web with tools specially designed for Web banner creation, including Web-safe colour palettes and video-like animation effects for animated GIF banners.

- Create your own original broadcast-quality banners for the Web
- Import colour palettes from Painter or PhotoShop, or create your own GIF palette
- Video effects include walk-ins, dissolves and fades for both images and text
- Unlimited undo lets you brainstorm to your heart's content!
- Split your text into individual words or letters and animate them one letter at a time!

MET031

**\$485**



## Canoma 1.0

**Quickly create realistic 3D models from photographs**

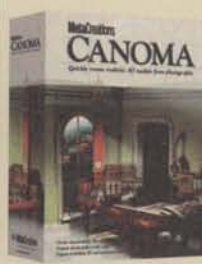
With Canoma you can create photorealistic 3D models from scanned or digital photographs quickly and without extensive 3D skills.

Model furniture, interiors, buildings or whole city blocks. Interactively walk through models and create animations. Retouch surface textures using your existing image editing tools and plug-in filter skills - Canoma generates distortion free textures to editors, so you can work in "head-on" view; add text and apply effects without worrying about perspective. Then post the results on websites or in electronic catalogues. Canoma exports in the extremely compact MetaStream Web format and also supports a variety of other industry standard formats (MTS, WRL, OBJ, PP2, SCN and DXF), so models can be imported into traditional 3D modelling and animation software.



MET034

**\$879**





# ONE STOP COMPUTER SHOPPING

GRAPHICS GRAPHICS GRAPHICS GRAPHICS GRAPHICS

## Dreamweaver 2

The Solution for Professional Web Site Design and Production

Quickly design Web sites while maintaining control over source HTML with Roundtrip HTML. Boost productivity with templates, site-wide editing and compatibility with your favorite design, database and e-commerce tools.

- Design sites collaboratively, separating content from design with XML and Dream Templates
- Make complex site-wide changes quickly with an integrated site map, global search and replace and automatic link management



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MAC117  
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MAC114  
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## Director 7 Shockwave Internet Studio (including Fireworks 2)

The Standard for Creating and Delivering Powerful Multimedia

Director unleashes your creativity with the only tools powerful enough to combine graphics, sounds, animation, text and video into compelling content that grabs your audience and delivers your message. The Internet is changing everything and Director 7 is changing the Internet.

- Deliver applications and presentations quickly through easy-to-use visual metaphors
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- New behaviour libraries
- Multiuser Server to build shared Web experiences and multi-player games



MAC112  
**\$1729**

## Flash 4

The Solution for Producing High-Impact, Vector-Based Web Sites

Flash 4 is the vector-based standard that empowers you to easily design and reliably deliver distinctive, high impact, low-bandwidth Web sites to all browsers.

- Deliver high-impact Flash sites by mixing and Synchronising MP3 streaming audio with interactive buttons and animation.
- Create distinctive user interfaces, site navigation and other Web applications without programming.
- Produce animated designs more efficiently than before with the optimised Timeline, smart motion guides and outline color mode.



MAC120  
**\$529**

## Fireworks 2

The Solution for Professional Web Graphics Design and Production

Fireworks is the first graphics production tool to overcome the specific challenges facing Web graphics designers and producers. With just one application, you can now design, optimise and integrate fully editable Web graphics, animations and comps.

- New! Complete set of time-saving design tools!
- New! Breakthrough optimisation options produce smaller files!
- New! Seamless integration with your favorite HTML editor!
- New! Automate your workflow across your site!



Upgrade  
MAC126  
**\$239**

MAC058  
**\$359**

## Dream Team

The Premier Toolset for Creating Professional Interactive Web Sites

A complete integrated solution for professional Web designers has finally arrived! Macromedia Dream Team allows graphic and Web designers to work seamlessly through the graphic and production process for creating high impact Web sites - with HUGE savings to add.

- Macromedia Dreamweaver 2
- Macromedia Fireworks 2
- Macromedia Flash 4

MAC090  
**\$919**



## BladePro The Ultimate Plugin. Create and Explore Touchable 3D Surfaces Extend the power of your image editor today!

BladePro is a Photoshop compatible plugin that fits most image-editing packages. Create touchable 3D looks by applying finishes such as tarnish, iridescence and glassiness for incredible results. Hundreds of presets give you eye catching web buttons, and more, instantly.

BladePro offers custom textures, zoomable previews, new light sources, mutation, and more. BladePro comes complete with:

- Hundreds of Presets and more...
- Heaps of Tutorials With BladePro you can quickly create:
- Online Links
- Tons of Textures
- Associated graphics tools to evaluate
- Eroded mud
- Scaly plastic
- Glittery aluminium
- Rough stone
- Tarnished copper
- Dirty brass
- Cracked paint
- and much much more..

COM105  
**\$69**



## Illuminatus 4.5

Add the excitement of interactive multimedia to your bright ideas

Whatever you've got to say, interactive multimedia makes it special. When you've only got a moment to make an impact, interactive multimedia gives you the advantage.

Combine words, pictures, video animation, sound and music into interactive publications the user can explore. Show them on your PC or publish them to floppy disk or CD ROM and distribute royalty-free to customers, clients, friends and family.

### Everything you need...

Illuminatus includes thousands of multimedia resources and professionally-designed template and sample publications for quality multimedia in instant whether you're a professional designer or not.

### Special Features:

- Fully-customisable transition effects including stars, circles and jigsaw.
- Semi-transparent and irregular-shaped video that has to be seen to be believed.
- Automatically narrate text for children's reading skills and language tutorials.
- In-built scoring for easy CBT that won't cost you a fortune.



COM106  
**\$249**

## Fandango The fast, fun way to create screensavers of all kinds for Windows 95

All the complex work is already done for you, just load some images, choose a style and adjust the simple, easy to understand controls and go. A Fandango screensaver works by playing a set of still or animated images across the screen in one of a series of customisable styles. You can use any of the hundreds of specially created actors included with the software or incorporate your own graphics, logos and images.

### Features

- Easy to use
- Royalty free distribution of your screen savers
- Import MID and WAV files to add music and sound effects
- Import: AVI; BMP; JPG; PCX; PNG; and TGA
- No programming required
- 5,000 resources included plus samples and tutorials

### For Business:

Brand your in-house or in-store machines with your corporate logo or a promotional message.

### For Home:

Create a screensaver from your favourite family snapshot or cartoon character.

### For the Web:

Create promotional screensavers to download from your web site to encourage surfers.



COM103  
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- 640 x 480 pixels
- Built in Flash

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PAGE 37



**Corel Gallery**

**1,000,000**



One Million is an easy-to-use, collection of clipart images, photos, fonts, sounds, and web images at a great price. Add excitement to any project with Corel GALLERY Magic 1,000,000. Find images with the new browser/search engine and alter them with powerful photo-editing tools. With over one million images\* to choose from, this collection is ideal for Web pages, newsletters, flyers and more!

COR541

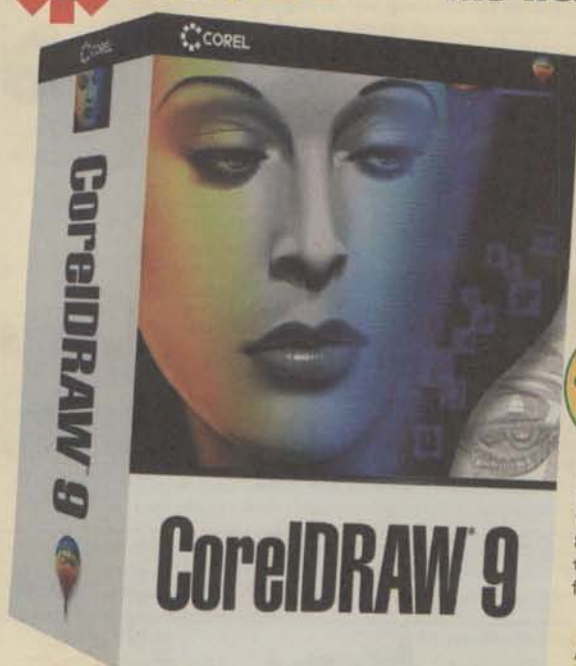
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**COREL®**

## CorelDRAW 9 Graphics Suite

*The world's number one PC illustration and image-editing program for professionals*



### CorelDRAW 9

Capture your creative spirit with CorelDRAW 9 Graphics Suite, the latest in a long line of award-winning illustration and image-editing software. This amazing suite gives you powerful interactive tools for creating dynamic special effects and bitmap images. Live Effects make it easy to experiment without losing your previous work! Plus, top-rate output capabilities help you get professional results. Create complex gradient fills with the Mesh Fill tool and ensure accurate color sampling with the Eyedropper tool. Enjoy expert page layout and text handling capabilities, including multi-page, multi-sized documents, full kerning control, frames and columns manipulation, Spell Check, Type Assist, Master Pages and more.



### Corel PHOTO PAINT 9

Corel PHOTO PAINT 9, also included, combines exceptional image-editing and natural media brush tools. Choose from over 15 Artistic Media brush types featuring hundreds of options-or create your own brush types. Easily import and edit multi-layered Adobe Photoshop PSD files-then export as PSD. Publish to the Internet with integrated powerful Web design features, including animated GIF creation and QuickTime VR, and support for GIF 89a, JPG, PNG, TGA and PCX. With a full collection of design and Web features that integrate into your existing workflow, CorelDRAW 9 delivers incredible flexibility. CorelDRAW 9 Graphics Suite-experience the legend in PC graphics.

### Added-Value Applications

Microsoft Visual Basic for Applications (VBA) 6 Bitstream Font Navigator 3.0 - industry-leading font management  
Canto Cumulus 4.0 - industry-leading media asset management  
CorelTRACE  
Corel CAPTURE 9  
TRUMATCH SwatchPrinter Software for Windows

### Libraries

25,000 professional clipart  
1,000 TrueType and Type 1 fonts  
2,500 high-resolution photos

### Applications

- CorelDRAW 9
- Corel PHOTO-PAINT 9

"CorelDRAW 9 mix[es] the latest industry developments with refinements to its already solid features. Users of competitive software should seriously consider CorelDRAW 9. CorelDRAW 9 continues to provide an excellent value - on top of its strong features and usability"

Australian Reseller News, March 99

CorelDRAW 9  
COR270

**\$749**

CorelDRAW 9 Upgrade  
COR271

**\$419**



## CorelDRAW Select Edition

Unleash your imagination with CorelDRAW Select Edition! This exceptional graphics suite gives you the tools you need for breathtaking results. Take advantage of CorelDRAW 7 and Corel PHOTO-PAINT 7 for graphic design, photo editing, special effects, illustration and page layout. Plus, a host of utilities makes the design process much more intuitive. CorelDRAW Select Edition-a powerful graphics solution for everyone!

COR542

**\$79**

### Core Applications

- CorelDRAW 7
- Corel PHOTO-PAINT 7

### Supporting Utilities

- Kodak Digital Science
- Colour Management System
- Corel OCR-TRACE
- CorelSCAN
- Corel MULTIMEDIA MANAGER

### Plus ...

- 50 clipart images
- 50 TrueType and Type 1 fonts
- Spellchecker
- Thesaurus



## Corel Print House Magic 4 Premium



Corel Print House Magic 4 Premium offers simple and creative solutions for home publishing and photo editing. Design projects for print or e-mail, including greeting cards, invitations and more, with customizable samples. Plus, follow step-by-step guides and use over 80,000 images to personalize material. It's easy to get started and the possibilities are endless.

Corel Print House Premium  
COR544

**\$85**

Corel Print House Classic  
COR545

**\$49**

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# ONE STOP COMPUTER SHOPPING

GRAPHICS UTILITIES GRAPHICS UTILITIES GRAPHICS

## CuteFTP

For Uploading Web Pages ...Fast!

CuteFTP is a Windows-based File Transfer Protocol (FTP) client that allows users to utilise the capabilities of FTP without having to know all the details of the protocol itself. This excellent FTP program has a lot more than just a pretty interface.

### Key Features

- Drag and Drop Interface.
- Fast Upload and Download.
- Resume Upload and Download.
- Remote File Editing.
- Queue Transferring.
- Bookmarks Remote Directories.
- Clipboard Monitoring of FTP links.
- Force Upper/Lower/Preserve File Case.
- CuteFTP has an excellent array of features, including caching, stop command and cool interface. It is a must have upgrade that's definitely worth the download.
- CuteFTP version 2.0 is specially designed to take advantage of the Microsoft Windows NT and Windows 98 operating systems. Microsoft, Windows, the Windows logo, and Windows NT are registered trademarks of the Microsoft Corporation.
- Keep Alive "Noop" Command.
- Integrated HTML Editor.
- Powerful Macros that Work.
- Directory Compare for Web Site Maintenance.



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AVAILABLE**



Cute FTP  
GBS001  
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## WinZip 7.0

The ultimate Companion for Internet Downloading

"Probably one of the wisest investments a savvy windows user can make"

WinZip brings you the convenience of Windows to the use of ZIP files without requiring PKZIP and PKUNZIP. It features an intuitive point-and-click drag-and-drop interface for viewing, running, extracting, adding, deleting, and testing files ZIP, LZH, ARJ, and ARC files.

### The Zip Advantage:

Ziping safely compresses the data in your files, so that your files occupy less space. This allows you to save more time by speeding up file transfers. "Ziping reduces the size of files, while "Unziping" restores the files to their original form, completely unchanged.

### Internet Surfers:

WinZip makes it easy for you to access almost all of the compressed files you download from the Internet. WinZip features built-in support for Zip, TAR, gzip, Unix Compress, UUENCODE, BinHex, and MIME files.

### Key Features

- Tight integration with the Windows 95/98/NT shell
- Drag & Drop to or from the explorer, or ZIP & UNZIP without leaving the Explorer
- Drop files on a printer to print
- With the easy to use tool bar you have the convenience of Windows when Ziping
- Built-in PKZIP-compatible ZIP and UNZIP (PKZIP and PKUNZIP are not required)
- Built-in support for the popular Internet file format TAR, gzip, Unix

- compress, Uuencode, Xxencoder, BinHex, and MIME
- Simplify file distribution by making files that unzip themselves
- Optional WinZip Wizard Interface
- Works with ARJ, ARC, and LZH files
- Optional virus scanning support
- Supports Windows 3.1, 95, and NT
- 32 and 16 Bit versions included

WinZip 7.0  
WIN119  
**\$65**



**The Archive  
Utility for  
Windows**

### PRICE PLEDGE



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NSW 2015



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The Intelligent Way to Create Powerful Technical Illustrations and Web Graphics

iGrafx Designer is the only complete toolset for technical and web graphics, with micron-accurate scale drawing and creative tools, and imaging graphics for publishing and the Web.

### Features & Benefits

- Includes iGrafx Business.
- Comprehensive annotation - annotate files with associative dimension lines, angular and radial dimensions, area, volume and perimeter along with call outs.
- Transparent vector effects - make colours, gradients or bitmap and tiled fills transparent or gradually transparent.
- Output interactive iGrafx Designer files as interactive JAVA applets for use with any web browser.
- Sticky lines and customisable object association.
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- Line styles for any type of technical illustration or fashion design.



MGF027  
**\$699**

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To make an impact and get your point across you need to communicate ideas, information and data using clear, instantly understandable visuals that give you and your company an edge. Create flowcharts, process maps, network diagrams and organisation charts faster and easier than ever before.

### Features & Benefits

- Includes iGrafx Business.
- Multiple fonts, interline spacing, paragraphs and bullets within shapes - Create attractive, stylish charts that accurately reflect the information being communicated.
- Powerful Graphics Engine - allows addition of vector, raster and 3D into diagrams.
- Automatic offpage connectors - makes multi-page printed diagrams easier to read. When published as HTML, connectors become hyperlinks.
- Web Links - All documents and web pages can be linked and accessed on demand.
- VBA6 integration- rapidly create custom applications or extend existing application functionality using iGrafx Professional as your front end.
- Visio Filter - Import diagrams created with Visio.



MGF025  
**\$695**

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## McAfee Office

One solution for every PC problem! Office is the latest addition to the McAfee family of products. Designed to keep your PC running at optimum performance McAfee Office offers the PC user everything they could possibly need to maintain a healthy system. With full versions of VirusScan 4, First Aid 98, Nuts & Bolts 98, Guard Dog, Uninstaller, Year 2000 Toolbox, Oil Change, and Hurricane - McAfee Office offers over \$600.00 worth of value for only \$169.00.



MCA075

**\$169**



## Fix-It Utilities 99

New from Mijenix, the makers of ZipMagic, FreeSpace and PowerDesk comes a brilliant new product to keep your PC in tip-top condition. Fix-It includes a myriad of utilities that check, clean, protect and secure your PC (Win 95/98 and Win NT).

Fix-It Utilities includes:

- Crash Protection
- Disk Fixer
- Disk Defragmentation
- Smarter Drive Optimising
- Clean & Optimise the Registry
- Hardware Diagnostics
- Bring back trashed files
- Virus Protection
- Year 2000 Tools
- Win 95, 98 & NT
- Emergency Disk Included!
- PowerDesk, valued at \$59.95 bundled FREE
- From Mijenix the makers of ZipMagic
- Winner PC Week Best of Comdex Award
- Head to Head winner against Nuts & Bolts & Norton Utilities



MIJ001

**\$89**

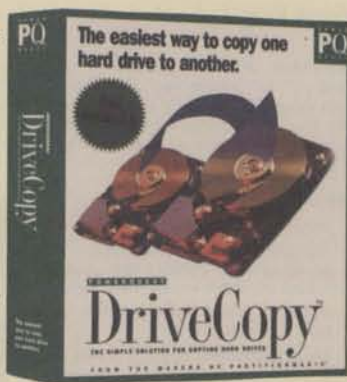
Fix-It Utilities 99 includes just about everything that you could need.. and it sells for under \$100! Even if you have Norton's Utilities you will immediately see the additional benefits you get from Fix-It Utilities 99.

## Drive Copy 2

**The safest, easiest, and most affordable way to copy everything from your old hard drive to your new hard drive**

There was a time when upgrading to a new hard drive meant hours of downloading your data, applications, and operating systems to disk; then hours more of reinstalling everything to your new hard drive. If it all went well, you could be looking at a few days worth of work. Of course, there was always the risk of scrambling your data or losing it altogether in the process. Fortunately, now there's DriveCopy from PowerQuest. With a few simple steps, everything from your old hard drive is automatically copied to your new one without losing a single preference, setting, or byte of data. With DriveCopy you can now run your operating system, applications and data on a new, larger and faster hard drive. No re-installing, no data loss, no headaches.

So go ahead - update your dinosaur with a new high-capacity hard drive. With DriveCopy, it's never been easier or more affordable.



CHK022

**\$49**

## FileMaker Pro 4.1 Complete Your Office Suite



**Now handles ODBC Import**



**FileMaker Pro 4.1  
FIL004  
\$349**



**Powerful relational database software**

- NEW built-in intuitive ODBC SQL Query Dialog lets users query ODBC data sources without requiring SQL programming expertise.
- Share departmental and regional information with instant web publishing - no separate web server application required.
- Capture information from - and share information with - visitors to your web site using custom web publishing.
- Take advantage of FileMaker Connection Assistant in HomePage 3 software (not included) to design eye-catching, interactive web pages.
- Create relational solutions to increase the power and flexibility of your databases. Even sort information from related databases.
- Share files between Windows and MacOS versions.

Features:

- Runtime version of FileMaker on the CD.
- 101 ready-to-use database solutions built in FileMaker Pro - timesheets, vehicle logbooks, business card maker, invoice maker and more.
- \$19.95 Refund when you purchase and register a full version of FileMaker Pro product.

**FileMaker Pro 4.1  
Upgrade  
FIL005  
\$235**

**FileMaker Pro 4.0  
Developer Edition  
FIL003  
\$825**

**FileMaker Pro  
101 Essential Database  
Solutions  
CLA060  
\$19.95**

## Drive Image

**The complete imaging solution for hard drive backups, upgrades and data recovery**

Drive Image lets you easily create a compressed image file of an individual partition or an entire hard drive. This file can be stored on a network, JAZ, ZIP, CD-ROM or tape drive and the download to make quick work of backups, data recovery or upgrading to a new, larger capacity hard drive. With Drive image, image files can be downloaded to drives of the same size or resized to fit drives of a different size and geometry for maximum flexibility.



CHK007

**\$105**

Feature	Drive Image	Drive Image Professional
Copy the entire contents of one drive to another within the same computer	*	*
Copy individual partitions or an entire drive	*	*
Create and restore hard drive image files	*	*
Create and store hard drive image files for back up, upgrades and system recovery	*	*
Specify partition size while copying to destination drive	*	*
Create, resize and move hard disk partitions on the source or destination drive with Partition Magic		*
Create and store image files to set up multiple workstations over a network		*
Configure workstations simultaneously with command line scripting		*
Swap partitions from one image file to another and record detailed information on each image with Drive Image File Editor		*
Professional Licence available for use by one technician on an unlimited number of work stations		*



# ONE STOP COMPUTER SHOPPING

UTILITIES UTILITIES UTILITIES UTILITIES UTILITIES UTILITIES

## Lost & Found

**Automatically recover and restore lost data!**

Your data is priceless. Whether it be the last five years of your financial records or Grandma Brown's favourite recipes, if anything happens to them - like deletion, virus infection, hardware failure - replacement would be difficult or even impossible. Fortunately, with Lost & Found from PowerQuest, restoring lost data is just a few keystrokes away. Rather than spending thousands of dollars to send your hard drive to a data recovery centre, Lost & Found lets you automatically recover and restore data after accidental (or even intentional) data loss, or from corrupted media caused by a disk crash or logical system failure. Our patent-pending technology will even recover data if the partition has been reformatted or if the FAT tables have been destroyed! In fact, as long as your disk is still spinning, Lost & Found can locate and recover almost any file, anywhere on your disk.

**What makes Lost & Found an easier, more effective data recovery system?**

Unlike other data repair and recovery software solutions, Lost & Found:

- Does not need to be installed prior to the recovery of lost or corrupted files.
- Does not alter, write to or attempt to repair critical sectors on the damaged disk, increasing the chances of a successful data recovery.
- Recovers your files even after reformatting, as long as you have not written over them.
- Performs a disk analysis and reports the odds of recovery via colour coding. Allows you to save data to a network drive.
- Offers exceptional data error handling, allowing you to recover files from disks that have suffered head crashes or other damage.
- Recovers lost or damaged data even if the critical sectors, such as the boot sector or root directory, are corrupted or missing.
- Recovers data from both FAT16 and FAT32 partitions. Works with all possible IDE, EIDE and SCSI disk-drive configurations.

**Common causes of data loss on PCs:**

### Software

Buggy software  
Viruses  
Operator error  
Software failure  
Application conflicts

Installation glitches  
Hackers  
Backup software failure  
Deletes

### Hardware

Electromechanical failure  
Head crash  
Controller malfunction  
Power failure  
Tape-drive failure  
Circuit failure  
CPU failure  
Environmental factors  
Media damage

POW041

**\$89**



## PartitionMagic 4.0

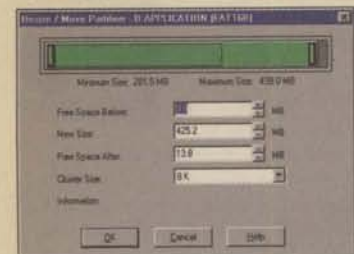
**Reclaim up to 40% of your hard disk & organise your hard drive!**

**Reclaim Wasted Disk Space**

Everyone wants to get the most they can out of their hard disk. But, up to 40 percent of your hard disk may be totally wasted due to inefficient storage methods. PartitionMagic 4.0 increases your usable disk space by shrinking large FAT partitions and restructuring cluster sizes to reclaim up to hundreds of megabytes of lost disk space.

**Safely Run Multiple OS's**

PartitionMagic 4.0 makes it easy to run multiple operating systems on the same machine without compatibility problems. Explore the new world of Windows 95, 98 or NT while still relying on the security of your current operating system. And PartitionMagic 4.0 includes BootMagic from IBM, making it easy to select an operating system every time you boot your computer.



Create, resize and delete partitions with the drag of a mouse.

Volume	Type	Size	Used	Free	File	Cluster
C:\	Extended	128.0	128.0	0.0	None	Primary
D:\	FAT16	102.4	102.4	0.0	None	Logical
E:\	FAT16	102.4	102.4	0.0	None	Logical
F:\	FAT16	102.4	102.4	0.0	None	Logical
G:\	FAT16	102.4	102.4	0.0	None	Logical
H:\	FAT16	102.4	102.4	0.0	None	Logical
I:\	FAT16	102.4	102.4	0.0	None	Logical
J:\	FAT16	102.4	102.4	0.0	None	Logical
K:\	FAT16	102.4	102.4	0.0	None	Logical
L:\	FAT16	102.4	102.4	0.0	None	Logical
M:\	FAT16	102.4	102.4	0.0	None	Logical
N:\	FAT16	102.4	102.4	0.0	None	Logical
O:\	FAT16	102.4	102.4	0.0	None	Logical
P:\	FAT16	102.4	102.4	0.0	None	Logical
Q:\	FAT16	102.4	102.4	0.0	None	Logical
R:\	FAT16	102.4	102.4	0.0	None	Logical
S:\	FAT16	102.4	102.4	0.0	None	Logical
T:\	FAT16	102.4	102.4	0.0	None	Logical
U:\	FAT16	102.4	102.4	0.0	None	Logical
V:\	FAT16	102.4	102.4	0.0	None	Logical
W:\	FAT16	102.4	102.4	0.0	None	Logical
X:\	FAT16	102.4	102.4	0.0	None	Logical
Y:\	FAT16	102.4	102.4	0.0	None	Logical
Z:\	FAT16	102.4	102.4	0.0	None	Logical

**PRESTO!**  
Optimise your hard drive without destroying data



### Organise and Protect Data

Create a physically separate partition for your valuable data files to protect them from potentially unstable applications. This simplifies backups, especially to devices like ZIP™ drives. And with the transport feature of Uninstaller™, PartitionMagic 4.0 lets you easily move applications from one partition to another with their files and operating system settings in place.



**PartitionMagic**  
HARD-DISK PARTITIONING BY THE FLY



PartitionMagic 4.0  
POW034

**\$89**

PartitionMagic 4.0 Upgrade  
POW033

**\$59**

**Now with BootMagic included!**

## System Commander Deluxe

Now you no longer have to fear losing valuable time and data while working out the kinks with your new operating system (OS). System Commander Deluxe gives you all the advantages of System Commander, plus these exclusive features:

- OS Wizard creates the best configuration for your new operating system.
- Creates and resizes partitions with no risk to your data, automatically!
- Universal mouse support



VC0002

**\$125**

### WHAT THE PRESS SAY..

"Unique, dazzling and indispensable, PartitionMagic is a must have product in an era of larger and larger hard disks"

PC Magazine

For the cost of a local call

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the entire range of  
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## Norton Ghost

### Personal Edition

Norton Ghost Personal Edition speeds up and simplifies PC system migration, hardware upgrade, disk backup and disaster recovery operations for technically savvy home computer enthusiasts.

Norton Ghost Personal Edition is a powerful disk drive cloning and imaging utility that speeds up and simplifies PC system migration, hardware upgrades, hard disk backups and disaster recovery operations. Technically savvy home computer enthusiasts will appreciate its flexible and "no-frills" interface that gives them exacting control over the process. Disk images can be stored on removable media and entire images or individual files or directories can be restored at will. Norton Ghost Personal Edition is based on Norton Ghost Corporate Edition, the world's most widely used PC cloning utility, which is recommended and used by more IT managers than any other solution.

#### Features

- Easily migrate data, applications and system settings to a new PC
- Clone existing hard drives to new hard drives
- Restore drive image or specific files in case of disaster
- Create a compressed backup of an entire hard drive



NOR106  
**\$119**



## pcAnywhere 9.0

SYMANTEC

The #1 seller for fast, easy access to any PC

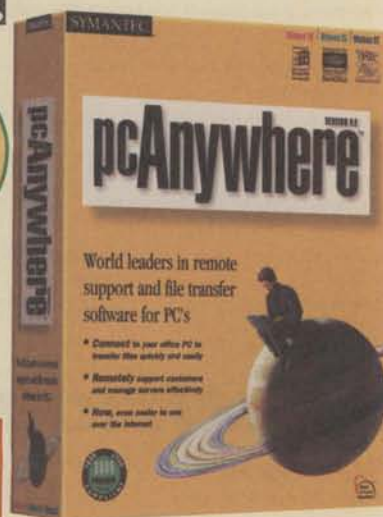
If you need to work from home or on the road, pcAnywhere lets you connect to your office PC to transfer files quickly and easily. Its special optimised design ensures the best possible performance at any connection speed. You can also run applications that reside on your office PC or a corporate server—a great feature for software that's too large to keep on your laptop or that can't be installed on external computers for security reasons. pcAnywhere supports a wide range of connection methods—including standard modems, ISDN lines, TCP/IP and IPX/SPX networks, direct cable, and infrared connection—so wherever you are, you're sure to find one that meets your needs. And now, it's even easier to use over the Internet.

If you're an IT professional, pcAnywhere lets you remotely support users and manage servers effectively. Monitor and control remote laptop and desktop systems to troubleshoot problems. Deliver training materials and pre-configured software updates to multiple users. Manage LANs, WANs, and even enterprise-wide information systems.

Version 9.0 features an enhanced file transfer interface, powerful centralised management and control, greater security, and LDAP directory services. And you can access all pcAnywhere functions through one clean, consistent interface.



SYM214  
**\$199**



## TalkWorks PRO 2.0

Give your small business a professional voice

TalkWorks PRO 2.0 from Symantec brings professional voice and fax messaging to home offices and very small businesses. Its integrated capabilities keep you in touch with your customers 24 hours a day.

#### With TalkWorks Pro 2.0

- Set up separate mailboxes for employees, fax on demand, and other purposes.
- Fax-on-demand allows you to provide your customers with information at any time.
- Get remote notification when a voice or fax message arrives.
- Track faxes and voice calls.
- TalkWorks PRO 2.0 even supports Caller ID\*.



TalkWorks PRO 2.0  
SYM193  
**\$219**

\* Caller ID service from telephone service provider and caller ID-capable modem required for some features.

## ACT!™ 4.0

Complete Customer & Calendar Management

SYMANTEC

Nobody knows your customers better than you do. The trick is remembering the right things about them at precisely the right time. ACT!™ 4.0 puts the information you need within easy reach - phone numbers, addresses, order history, even invoice dates.

- Leverage the Internet
- Stay connected online
- Become a genius with details
- Manage every day more efficiently

#### Features

- Now includes business templates for major businesses across Australia
- Flexible customer database - Get started right away with 70 preset user fields
- Customise the database with your own fields, custom screens and on-line forms
- Attach files, such as spreadsheets and documents, to your contacts



Act! 4.0  
SYM179  
**\$149**

## WinFax PRO 9.0

The world's #1 choice for hassle-free faxing!

WinFax PRO 9.0 software takes Symantec's industry-leading fax solution to new levels of flexibility, reliability, and ease of use.

#### With WinFax PRO 9.0

- Small businesses can look more professional by sending crisp laser-quality faxes.
- Workgroups can save money by sharing a fax modem and phone line through a non-designated fax host.
- It can also notify mobile users via pager or PCS cell phone as soon as an important fax arrives, or automatically forward faxes to another fax number or an e-mail address.



WinFax Pro 9.0  
SYM191  
**\$125**



# ONE STOP COMPUTER SHOPPING

COMMUNICATIONS COMMUNICATIONS COMMUNICATIONS

## Norton AntiVirus™ 5.0

Gold Edition

Norton AntiVirus™ from Symantec is the #1 anti-virus software in the world

New features in version 5.0 let you quarantine infected files, easily get help with viruses directly from Symantec researchers, and it automatically protects you against viruses as well as malicious ActiveX and Java applets.

- Quarantine an infected file, and it's safe to store on your computer without fear of spreading the virus. The new Scan and Deliver wizard makes it easy to send quarantined and other suspicious files to Symantec for evaluation. The virus experts at the Symantec AntiVirus Research Center (SARC) will reply swiftly with helpful advice and any needed anti-virus definitions.

- With version 5.0, the software can also detect dangerous forms of ActiveX code, Java applets, and Trojan horses, giving you the industry's most complete protection against malicious code.

- Bloodhound technology uses advanced heuristic logic to "sniff out" and eliminate new viruses even without updated virus definitions.

As always, Norton AntiVirus can run constantly in the background to keep your computer safe from viruses that might come in from e-mail attachments, Internet downloads, floppy diskettes, software CDs, or a network. And it can be scheduled to automatically retrieve new anti-virus definitions from Symantec as often as once a week.



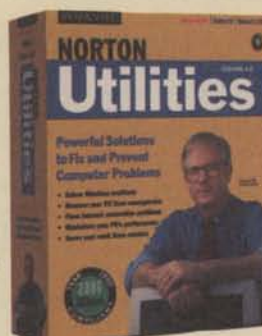
**Norton AntiVirus  
Gold v5  
NOR090  
\$85**

## Norton Utilities™ 4.0

Unrivalled problem solving power  
Unrivaled Control

- Finds, fixes and prevents problems
- Monitors and maintains your system
- Ensures great performance
- Rescues and recovers information
- Allows custom configuration
- Boots emergency recovery program from the Norton Utilities CD
- Deletes files permanently

Norton Utilities gives you the right tools plus expert advice to tackle each job. The new Norton System Check feature runs an entire battery of tests with a single click. Norton Zip Rescue and the Rescue Recovery Wizard help you recover from emergencies. Norton Connection Doctor makes sure your modem is working correctly, and Norton System Doctor and Speed Disk maximize system and hard drive performance. You even get Norton CrashGuard, a \$39 value. No wonder that Norton Utilities offers more effective problem solving than any other product!



**Norton Utilities  
Gold Edition  
NOR096  
\$115**

## Norton System Works™ 2.0

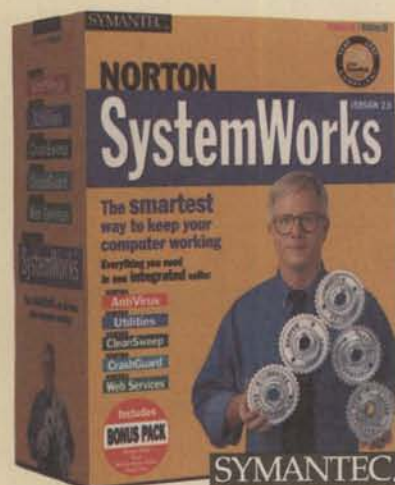
Norton SystemWorks™ 2.0 combines the first integrated utility suite with advanced tools for PC experts – all for one great price. The suite includes the latest complete versions of Symantec's award-winning utility products. These state-of-the-art products work together to both fix and prevent system problems.

- Norton AntiVirus™ 5.0 – offers the world's most popular and most powerful anti-virus capabilities – including the ability to isolate infected files before they can damage your system.
- Norton Utilities™ 4.0 – is the industry leader in detecting, repairing, and preventing hardware and software problems. It also optimises your computer to run at peak efficiency.
- Norton CleanSweep™ 4.5 – recovers disk space by safely and completely removing unnecessary programs and files.
- Norton CrashGuard™ 4.0 – automatically protects against system crashes and screen freezes.
- Norton Web Services™ – gives you online access to the latest hardware drivers and software updates.

Free Bonus Pack Worth OVER \$500 includes:

- Symantec Visual Page™ – a web development tool.
- WinFax™ Basic Edition sends and receives faxes directly from your computer.
- Zip-It™ – compresses and extracts zip files.
- Norton 2000™ – to make your PC and data "millennium ready".

**Year 2000  
Compliant**



**Norton  
SystemWorks 2.0  
NOR097  
\$179**

## Norton SYMANTEC. CrashGuard™ 4.0

Don't risk losing important documents and hours of work! Norton CrashGuard 4.0 gives you more power to save your work from crashes. It stops crashes from becoming major disasters by helping you save your open documents and get back to work quickly. In fact, you can usually resume your work without rebooting your system. The Crash Assistant feature guides you through each crash situation step by step – even offering multiple recovery options to maximise your chances of successfully saving your work. There's no better software than Norton CrashGuard for recovering from application crashes, application freezes and system crashes.



**Norton CrashGuard 4  
SYM199  
\$39**

## Norton SYMANTEC. CleanSweep™ 4.5

Clean up your hard drive with the award-winning leader: Norton CleanSweep from Symantec. It improves your PC's performance by completely and safely removing unneeded items while protecting vital programs, files, and Windows settings. It even gets rid of extraneous cookies, ActiveX controls, plug-ins, downloaded programs, and other Internet files. A graphical interface and intuitive wizards make Norton CleanSweep as easy to use as it is thorough. In short, Norton CleanSweep is the quickest, easiest, safest way to recover hard drive space. Don't take risks with your computer – trust the Norton name for safe, complete hard drive cleanup.



**Norton Cleansweep 4.5  
NOR095  
\$59**

## Norton™ 2000 SYMANTEC.

Prevent damage to your company's desktop PCs and data from Year 2000 problems

In assessing Year 2000 exposure, don't forget that date anomalies in desktop PCs or applications can cause local problems or spread to the mainframe. Norton 2000 gives you an easy, reliable, and flexible way to address Year 2000 anomalies at the desktop level, in applications, and in system clocks and BIOS.

Features:

- Finds Y2K anomalies in desktop applications.
- Tests and fixes system BIOS and clocks.
- Automatically updates database of Y2K compliant software.
- Supports central installation and administration.
- Provides flexible scanning/reporting options.



**Norton 2000  
NOR086  
\$65**

**SYMANTEC  
VALUE LICENCE  
PROGRAM  
SAVE TIME AND  
MONEY**

**SYMANTEC.  
VALUE LICENCE  
PROGRAM**

The Symantec Value Licence Program has been designed to make purchasing Symantec products quicker and cheaper. Just one phone call to our sales team could get you significant discounts for your organisation. Reordering is then a simple case of calling us and quoting the number from your certificate.

Designed for companies and organisations ordering more than 10 licenses, the Symantec Value License Program ensures you get the discounts you deserve.



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### Wasting too much time on the road?

#### Get LapLink Professional and get productive

LapLink Pro lets you work whenever and wherever it's convenient for you. When you need to share information between an office PC, a laptop, or your home PC while travelling or working away from the office, LapLink Pro will get you connected.

LapLink Pro sets the standard in usability and is the #1 rated choice for easy, speedy and reliable remote control and file transfer by mobile professionals and telecommuters.

When you take a look at the features this product offers, it's no wonder that LapLink Pro is agreed upon by the experts to be the "best remote control access solution today":

- Print redirection from remote PC to local printer, or to a remote PC's printer
- Optimised for Windows 98
- Supports USB cable for faster file transfer
- Includes bonus Windows CE remote control software
- Single mode operation - no need to set "guest" or "host" modes
- Adaptive compression automatically gives optimal speed over all connections
- Integrated scheduler for Windows 98, 95, NT
- Smart Install configures all devices automatically - no user intervention required
- Compatible with Windows 3.1, 95, 98, and NT



LapLink has won more awards than all of its competitors put together.

**LapLink Professional  
LAP011  
\$174**

### Laplink Tech

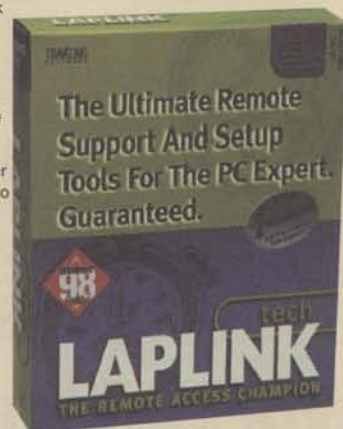
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LapLink Tech provides the tools you need to remotely support customers, set up and upgrade PCs quickly and defend against viruses - all in one complete solution. No matter where your customers are or where you work, LapLink Tech offers you the flexibility to support your customers whenever they need it. LapLink

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- ✓ And much, much more!



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### Dragon Naturally Speaking Preferred

All the features of Dragon Naturally Speaking Standard, plus:

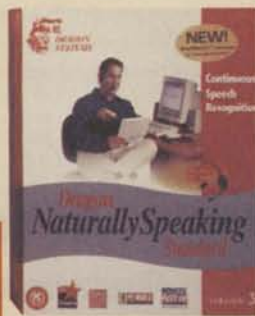
- Even Higher Accuracy - Industry-leading BestMatch recognition technology reduces errors by 25% to achieve higher accuracy than ever before.
- New, Even Larger Vocabulary - 42,000 active words (230,000 total)
- Text-To-Speech - Listen to your own documents or other files such as e-mail read aloud to you.
- Dictation Playback - Listen to a recording of what you said before you edit, in order to keep your original intent.



### Dragon Naturally Speaking Standard

#### Features

- Immediate Recognition - Your words appear immediately on your screen and in your document.
- Integration with Microsoft Word 97 and Corel WordPerfect 8 - with Dragon Systems editing technology create, edit anytime, and format any word or phrase easily using intuitive commands.
- New, Larger Vocabulary - more than 35,000 active words (230,000 total). Personalise your vocabulary by automatically adding new words, specialised terms, and names in a few simple steps.
- Up to 160 Words per minute.
- Accuracy as high as 98%.
- Hands-Free Editing - Move your mouse pointer with pinpoint accuracy, click buttons, 'press' any key on the keyboard, and activate menus by simple voice commands.
- Text Shorthands - Quickly insert frequently used phrases and sentences just by saying a single word or phrase.
- True Continuous Speech - just speak naturally, without the need to pause between words.
- Learns most speaking styles, even strong accents, and supports multiple users.
- Includes high quality microphone.



### Dragon Naturally Speaking Mobile



#### Create text anywhere

Dragon Naturally Speaking Mobile is the complete speech recognition system for people on the move.

- Holds up to 40 mins of continuous speech on built in memory cards.
- An additional 80 mins can be stored on removable memory cards.
- Speak at up to 160 words per minute.
- File your recordings into folders for ease of use.

**Don't Be Chained To Your PC. Talk To Your PC Anytime Anywhere.**

Its so easy!!



Press 'Record' button and speak into the recorder's built-in microphone.



Select which recordings you want transferred to the PC.



Connect the recorder to your PC using the included cable.



Press 'Transcribe' and your recorded speech appears as the text on your screen and in your document.



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McA070

## \$69



## CHECK 2000 PC

- Flags and helps to fix year 2000 PC problems
- Helps Fix your hardware
- Analyses your software
- Provides detailed advice



Greenwich Mean Time

What CHECK 2000 PC does for you:

- Finds and eliminates hardware date problems in 98% of BIOS types by correcting the PC BIOS system clock.
- Tells you how your data and software will be affected by the year 2000 changeover.
- Gives advice on avoiding problems inherent in many thousands of popular software programs.
- Helps you prioritise software and data problems for timely repair.
- Lets you run the program as many times as you like to keep monitoring your PC's year 2000 status
- Provides free technical support for 90 days.
- Compatible with Win 3.1/3.11, Win 95, Win NT 3.x, Win NT 4.0.



GRE001

## \$69

## CHECK 2000 Client Server

Scans your network to find and help fix Year 2000 PC problems

Only Check 2000 Client Server does all this and more...

- Performs a detailed hardware and software audit of your network
- Finds and help to Fix critical (BIOS) problems on your network
- Supplies a top-down view of your year 2000 readiness
- Provides detailed reports for all levels of your enterprise, from management to technical
- Prioritizes software and data problems for timely repair
- Offers ongoing risk assessment to maintain your protection, as you change and add to your network.
- Collates network data into one common database
- Scans spreadsheets and databases for year 2000 problems, drilling down to individual cells

Greenwich Mean Time



GRE005

## \$399

The client server software will run on the following operating systems: DOS, Win 3.1x (including for workgroups), Win 95 and Win NT 4.0

## VET Anti-Virus VET PREMIUM

Virus Protection For All Platforms

Essential Protection

Virus protection has never been as essential as it is today. New viruses are continuing to appear at an ever-increasing rate and new types of viruses - for instance Word macro viruses - regularly take the PC World by surprise. The internet, intranets, networks, Email, shared disks and shared PCs all enable viruses to spread. Vet Anti-Virus Software provides you with the protection you need for your system, whether it is a stand-alone PC or a complex network of PCs in an organisation.

This combines all the advantages of Vet Net Surfer with the additional benefit of mailed quarterly upgrades - delivered to your home or office. The choice is yours - Vet Net Surfer with on-line upgrades, or Vet Premium with on-line and mailed upgrades. Both offer complete virus protection for you PC.

- Unlimited phone and email support
- Unlimited access to upgrades on-line
- Upgrades mailed quarterly direct to you



AUSTRALIAN MADE

Vet Net Surfer  
(updates via  
Internet only)  
VET006  
**\$75**

Vet Premium  
VET007  
**\$89**

## Netware or NT Server

Year 2000 compliant

This is a server specific product offering protection which is simple to install and use. It offers three modes of operation - a periodic scanner for pre-scheduled virus checks, an "On Demand" scanner which can be initiated at any time if a virus is suspected, and automatic, or "On-Access" checking so that users are protected without having to initiate a scan. Each option is highly configurable giving the administrator flexibility to set it up to suit their conditions and system.

- Unlimited phone and email support
- Unlimited access to upgrades on-line
- Upgrades mailed quarterly direct to you

Year 2000  
Compliant



Vet NT Server  
VET009

## \$449

Vet Netware Server  
VET008

## \$449

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Complete virus protection for your server and workstations all in one product. You will receive all the benefits of a multiple workstation license together with protection for the heart of your network. Vet Corporate is available for 1 server - choose from either NetWare or NT Server - and for 10, 25, 50, 100 and 200 PCs, for Windows 3.x, Windows 95 and Windows NT Workstation.

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## CHECK 2000 PC DELUXE



### The Ultimate tool for beating the Millennium Bug!

Check 2000 PC Deluxe is the only integrated year 2000 testing tool that addresses all five "at-risk" layers of your PC. You can correct the BIOS, test the operating system and software programs, scan your data files, and flag data importing issues.

#### CHECK 2000 PC Deluxe gives you more:

- ✓ Helps find and correct the year 2000 hardware (BIOS) problems on the spot
- ✓ Flags problems in software programs, includes the world's largest database of remediation advice
- ✓ Lets you check new data from e-mail, internet, disks, CDs and other outside sources as often as you like
- ✓ Scans all the way down to individual cells in spreadsheets, databases, and other data files
- ✓ Helps you prioritize software and data problems for timely repair



Greenwich Mean Time

Greenwich Mean Time

"Today CHECK 2000 is established as the standard by which other year 2000 products are measured"  
Microsoft Y2K Resource Centre.

GRE002  
**\$85**

#### 1 Test and Help Correct BIOS

A simple pass/fail screen tells you if your BIOS passes or fails the critical date tests. Then Check 2000 PC Deluxe will help correct the problems for you in 98% of BIOS types.

#### 2 Check your operating System

Check 2000 will test your operating system, identify any 2-digit settings, and then recommend the changes you need to make. We check all of the popular operating systems, including: Win95/98, NT 4.0.

#### 3 Keep Checking Imported Data

Check 2000 PC Deluxe identifies software programs that import and export data. Then Data Scanner finds date-dependent data so you can correct it.

#### 4 Analyse Software Programs

Every application treats date-dependent data a little differently. Check 2000 PC Deluxe will do an inventory on your application programs - and show you which programs are most at risk (usually it's spreadsheets, databases, and schedulers). Year 2000 advice is provided on over 5,000 software programs. The knowledge base built into Check 2000 PC Deluxe recognises over 20,000 programs.

#### 5 Pinpoint and Prevent Data Problems

Drill all the way down to the individual cells in spreadsheets- and other data files- that could cause problems. Correct the data as it's revealed to you by Check 2000, without switching between software programs. You can run the Data Scanner at any time, to continually reveal any new date-dependent data that comes into your PC.

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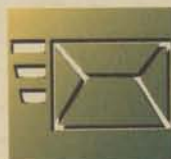
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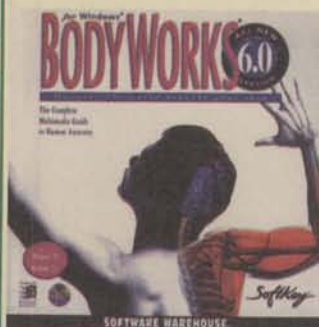


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Learning to program for the Palm and Mac, and introducing networking and IE5.

## Dig Mac with ease

### Mac Programming For Dummies

If you've ever read a 'For Dummies' book, you'll know what to expect: a light-handed, somewhat irreverent approach to a technical subject, which avoids scaring people away. This third edition fits the mould.

The author gets the traditional 'Hello World' program out of the way, then sensibly delves into the use of resources (window and menu definitions, and so on). As resources are central to Mac software development, it's a very good idea to get used to them as soon as possible.

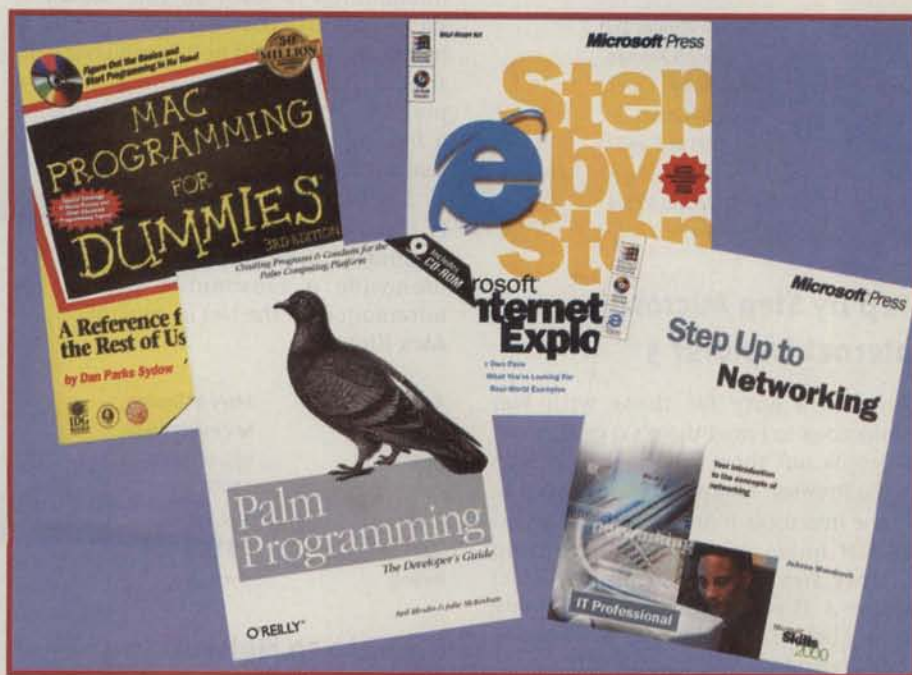
A copy of Metrowerks CodeWarrior Lite on CD-ROM accompanies the book (so no further purchases are necessary to get started), but some chapters also cover the use of CodeWarrior Professional. The Lite version doesn't allow the creation of a new project, but it does let you make changes to an existing project, such as those described in the book and provided on the CD.

The emphasis of the first third of the book is on the mechanics of creating a working program using CodeWarrior, as opposed to the design of a program and coding it in a particular language (in this case, C). The basic language features are introduced clearly and with a minimum of fuss, before turning to the constructions that make a program look and work like a 'real' Macintosh program.

A couple of production errors — notably an incorrect screen image, and the omission of the trailing space in references to 'snd' when discussing the way some resource names end with a space — will confuse readers.

*Mac Programming For Dummies* is a good place to start and one of the clearest introductions to Mac programming I've seen, but unless you're already a programmer you'll probably need another book which spends more time on program design.

Stephen Withers



Author	Dan Parks Sydow
Publisher	IDG Books Worldwide
Distributor	Woodslane
Phone	1800 803 443
Price	\$44.95
ISBN	0-7645-0544-0
Rating	★★★

### Palm Programming: The Developer's Guide

If you've ever wanted to write your own applications for the Palm, whether it's for automating your sales force or keeping track of your household expenses, *Palm Programming* is a useful resource that will give you background and depth of knowledge.

The book starts with an overview of the Palm OS, the programming tools needed and a discussion of some of the things you will need to consider when programming for the Palm. The next section of the book walks you through designing a few simple applications, and then a large and

detailed application used to record orders for a salesperson. The style of this section is sometimes terse, but experienced programmers will appreciate its lack of waffle. This section is rounded off with a discussion of communications protocols and debugging your application. The last section of the book discusses how to design conduits for transferring data.

*Palm Programming* targets itself at intermediate to experienced C programmers. If C code looks like gobbledygook to you, you'll quickly be lost reading this book. If you want to program conduits to transfer files to and from the Windows platform, which the book covers in some

#### Guide to ratings

★	Wayne Arthur: Dark horse
★★	Mark Philippaerts: A little unreliable
★★★	Livyon Hewitt: Lots of promise
★★★★	Paul Gaffer: Second seat
★★★★★	Jelena Dokić: Giant killer



detail, you will need to know some C++ as well.

The bundled CD includes Metrowerks' CodeWarrior Lite (sans help and support files) for Mac OS and Windows, and Palm OS emulators for Mac OS, Windows and Linux. As usual, the CD's content gives you enough to play with while you're reading the book, but if you're going to take things further, you will need to invest in full versions of the software.

**Josh Mehlman**

<b>Author</b>	Neil Rhodes and Julie McKeenan
<b>Publisher</b>	O'Reilly
<b>Distributor</b>	Woodslane
<b>Phone</b>	1800 803 443
<b>Price</b>	\$75
<b>ISBN</b>	1-56592-525-4
<b>Rating</b>	★★★

## Step by Step Microsoft Internet Explorer 5

It's all too easy for those with Net connections to forget there's a great mass of people out there who've never even used a browser. Microsoft, always keen to plunge into mass markets, obviously had the Net naive in mind when putting together *Step by Step Microsoft Internet Explorer 5*. If you've used practically any browser before, then the book will serve as a basic reference only for some of IE's more obscure features. If you've never taken the plunge, however, you could do worse.

The book starts off simple. Very simple. As simple as "If your computer isn't on, turn it on now". From there it builds on basic Web principles, explaining concepts and utilising them through the supplied tutorial files. It covers the basic and advanced features of

IE, as well as the Windows Media Player and Outlook Express. Most of the text is pretty good, although there are a few dubious assertions. For instance, according to the text, all pages on the Net are constructed using frames, and non-framed pages are created "as a courtesy to those who use older browsers".

Mirroring the simple text style, diagrams are used at every single opportunity, almost to the point of overkill. It wouldn't take too much imagination to learn all you needed to know about IE5 without actually installing it and just noting which screen should pop up when. The book also proudly proclaims that the CD contains a free copy of IE5. Whoopee. There's a real saving.

*Step by Step Microsoft Internet Explorer 5* is a reasonable text for absolute Net beginners, given that it fully covers IE5 alongside a reasonable amount of information on the Net in general.

**Alex Kidman**

<b>Author</b>	Mary Milhollon
<b>Publisher</b>	Microsoft Press
<b>Distributor</b>	Woodslane
<b>Phone</b>	1800 803 443
<b>Price</b>	\$69.95
<b>ISBN</b>	1-57231-968-2
<b>Rating</b>	★★★

## Step Up to Networking

Microsoft Press books are generally well written, well designed and easy to read. When you have such a large marketing and educational budget, you wouldn't expect anything less.

*Step Up to Networking* is designed for the reader with little or even no experience in the concepts of modern computer networks. Many such titles are

appearing on the market to help encourage people into the IT sector to fill the increasing shortage of skilled IT workers. Microsoft has its own educational initiative called Skills 2000, which is a set of books (of which this title is the first) designed to help students progress through the learning stages required to gain IT skills.

On opening the book, a standard formula becomes apparent. The first chapter is about the history of networking. The following chapters move on to cover standards, LAN, WAN and finally Internet technology.

*Step Up to Networking* is refreshingly up-to-date, including coverage of technologies that will not become mainstream until after 2000. The author has done a good job; the ideas and concepts flow easily, and diagrams and tables illustrating the key points are well-drawn. A CD is included which contains information on the Microsoft Skills 2000 initiative as well as a few testing tools to see if you have absorbed the knowledge in the book.

*Step Up to Networking* contains a good glossary and index. Surprisingly, the author has not included any quizzes or tests in the book itself. She has opted for a conversational tone which makes for an easy and even enjoyable read. This book is the perfect starting place for anyone who wants to work in the networking field.

**Lachlan Botticchio**

<b>Author</b>	JoAnne Woodcock
<b>Publisher</b>	Microsoft Press
<b>Distributor</b>	Woodslane
<b>Phone</b>	1800 803 443
<b>Price</b>	\$69.95
<b>ISBN</b>	0-7356-0572-6
<b>Rating</b>	★★★

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## 100Mbps Network Starter Kit



This kit has all the hardware components required to build a 100Mbps network for two PC's and includes a comprehensive

installation manual. All software is part of Win 95/98/NT. The 100Mbps Network Starter Kit provides the most cost-effective solution for users who desire fast throughput at the cost of traditional 10Mbps. The kit includes one 4 port 100Mbps Fast Ethernet hub, two 10/100Mbps PCI Fast Ethernet adapters, two 5 metre Cat. 5 network cables and software drivers for the adapters.

Cat. 11900	100Mbps Network Starter Kit	\$339
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Cat. 11298	10/100 BaseTX Ethernet Hub 16 Port	\$999

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Internal PCI Plug & Play 5 Port hub and LAN card does not require external power supply. One port can be used as an uplink port for easy expansion, or used for hub connectivity at the server.



Cat. 11295	Ethernet Hub & LAN Card 5 Port UTP 10Mb	\$109
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## 100Mbps Ethernet 5 Port Hub Card



Mounts on the back plane of a computer but does not plug into a slot, it only connects to the power supply. No separate case & power supply means reduced costs, plus every-

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This card carries the NSTL "Compatibility Test" seal.

Even Pentium motherboards are not immune to the Year 2000 bug! This Year 2000 BIOS Card solves the problem of progression from 1999 to 2000 as well as 21st century leap years. It is also double-buffered to take care of the Crouch-Echlin effect. "It worked well in fact, and the machine passed all the tests we threw at it." Mar 99 Electronics Australia magazine.

Cat. 3359	Year 2000 BIOS Card	\$129
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## Perspective

### Gotcha: Life in a Tabloid World

In the two years since Princess Diana's death, there has been intense debate about what's wrong with the tabloid media. This debate flared up again more recently, during Kenneth Starr's investigation into President Clinton's liaison with Monica Lewinsky. Commentators in the 'quality' media, such as ABC TV's *Media Watch* and the broadsheet press, frequently criticise tabloids for their invasive, inaccurate, sensationalist and entertainment-driven coverage of issues ranging from the trivial to the scandalous.

In *Gotcha*, journalist and academic Catharine Lumby argues that this debate has overlooked the fact that the tabloid media is often more democratic than the quality media. The quality media allows experts to express their views on current events, but talkback radio, daytime talk shows, women's magazines and current affairs television allow many more people to have their say. "In all of these spaces, every day," Lumby writes, "people interact, talk back and make sense of what living is like in the late-20th century."

*Gotcha's* central theme is that conventional ideas about the public sphere are no longer relevant. "The mainstream mass media has effectively become a global village hall, a place where diverse public interests collide," she writes. "Western public spheres have become a forum for voices which were largely excluded from public debate, even 30 years ago." However, these excluded voices have been able to find expression on talkback radio and daytime TV.

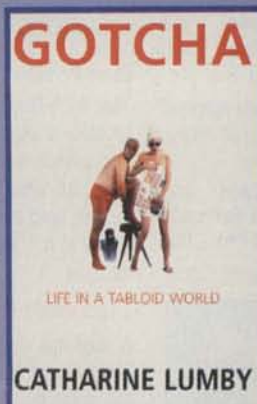
*Gotcha* does not adequately consider the extent that the Internet has altered the media landscape. Newsgroups and email lists are very much like talkback radio, but exist on a global scale. Although Lumby mentions fan Web sites in a chapter about celebrities, the

Internet is only discussed in detail in a section about Pauline Hanson. Lumby states that One Nation successfully welded "cutting-edge media technology — in the form of the Internet — and pre-modern town-hall meetings to reach its public."

In her attempt to show the positive side of the tabloid media, Lumby overstates the case. Although there is a discussion of ethics and tabloid media, *Gotcha* does not ask to what extent the tabloid media frames public debate, and which voices it authorises to speak. However, Lumby is adept at communicating complex ideas to a broad audience, and her wit in reference to

recent media events makes *Gotcha* a fascinating reading.

Glenn Phillips



<b>Author</b>	Catharine Lumby
<b>Publisher</b>	Allen & Unwin
<b>Distributor</b>	Allen & Unwin
<b>Phone</b>	(02) 8425 0100
<b>Price</b>	\$16.95
<b>ISBN</b>	1-86508-073-X
<b>Rating</b>	★★★★

### Direct from Dell

When he was in third grade, Michael Dell responded to an advertisement that offered a high school diploma by passing a simple test. The boy's mother was taken aback when she received a visit from the testing representative, who wished to see a Michael Dell about the test.

"He's taking a bath right now, but I'll call him," his mother reportedly replied. It was then the representative who was surprised when out came eight-year-old Michael in a red terry towelling bathrobe.

Dell was serious about the test because he wanted to eliminate unnecessary steps and inefficiencies from an early age. That was Dell's last lukewarm investment experience.

Michael Dell's founding and building of his hugely successful company, Dell

Computers, has been one of the big IT business stories. Apple may falter, Compaq may blunder, but Dell has quietly moved into the top five computer manufacturers. Furthermore, the company's products have been favourably rated for their design and support.

Built on a formula of providing cheap PCs direct to buyers, Dell Computers became a \$US18 billion-a-year company, and experienced a growth surge due to Dell's decision to be one of the first to sell over the Internet.

However, those looking for an insider's impression of what Dell is about may find this book disappointing. There is some meaty stuff, but to find it you have to wade through trite and occasionally corny accounts of the company and its business methods.

The first part provides a useful though coy account of Dell's early struggles with the direct order model — regarded at the time as unsuitable for a product as complex and expensive as a computer.

The lesson Dell learned from early on was that no matter what industry you're in, try to identify potential problems early and fix them fast. He also learned the importance of involving customers in development processes.

The second part of the book discusses the strategies he learned, and skates close to homilies such as one size does not fit all, expand your range of vision, and become a Valued Advisor.

The strength of the book lies in the lessons drawn from Dell's implementation of his business principles, rather than any

compelling vision. Much of the rest is padding.

John Hilvert



<b>Author</b>	Michael Dell
<b>Publisher</b>	HarperBusiness
<b>Distributor</b>	HarperBusiness
<b>Phone</b>	1-800-655-210
<b>Price</b>	\$45
<b>ISBN</b>	0-00-2570696
<b>Rating</b>	★★★



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# Home improvement

## 3D Home Interiors Deluxe 2.0

Any modern interior decorating package should allow you to quickly and easily sketch out a room, pick a colour scheme, drop in some furniture, adjust the lighting, and then see your masterpiece in glorious 3D. Home Interiors Deluxe more than adequately fulfils this brief, allowing you to easily switch from a 2D floor plan to a 3D-rendered view. It also offers more than 100,000 brand name items of furniture, appliances, floor coverings, paint and virtually anything else you might require in the decorator line.

In the earlier version of this package, the biggest problem was that the included furniture couldn't be resized. This problem



has since been eliminated, allowing you to create accurate scale replicas of your own furnishings and you can see how they'd look in different arrangements, or with a newly painted wall behind them. It's easy to waste enormous amounts of time in this way, but it's still preferable to moving the furniture around a room and well worth the cost of the package.

The one annoying feature is the relentlessly American feel. Not only are many of the pieces of furniture sorted into non-intuitive categories, they reflect a peculiar view of recent trends in interior design. There are more marble floors and Mexican-style throw rugs than you're ever likely to want, but if you want a high-tech, minimalist interior, you'll be lucky to get past white walls and a plain carpet. The lack of Australian equivalents for most of the furniture also greatly reduces the usefulness of one of the key features: the ability to print out a shopping list based on the room you've set up.

Despite these grizzles, however, 3D Home Interiors Deluxe is still handy if you're planning to redecorate.

**Angus Kidman**

<b>Publisher</b>	Brøderbund
<b>Distributor</b>	Dataflow
<b>Phone</b>	(02) 9417 9700
<b>Price</b>	\$119.95
<b>Requires</b>	Pentium 100, Windows 95/98, 16M RAM, 2x CD-ROM drive, 22M hard disk space, SVGA
<b>Rating</b>	★★★☆☆

## Cosmopolitan Virtual Makeover

If you've ever wondered what you'd look like with a Merv Hughes moustache, short green curly hair, or covered in rollers, you need Cosmopolitan Virtual Makeover.

The program has been designed with non-multimedia users in mind; it has a simple interface and most of the options are self-explanatory. It is also comprehensively supported online at <http://www.virtualmakeover.com/>. The most difficult part is finding a suitable picture of yourself.

First, you need to scan your photo and save it as a BMP. If you don't have access to a scanner you can send your film in the included Business Reply Mail envelope all the way to the US for processing. Herein lies the biggest problem with Cosmopolitan Virtual Makeover — it's made in America for Americans. Many of the hairstyles are bigger and the make-up brighter than most Australians would use.

Once you have a scanned picture, you need to position your face under the facial guide to ensure the hairstyles sit correctly. You can reduce and enlarge the size of your head to fit the guide, but unfortunately you can't rotate it. So, if your head is slightly tilted some options look a bit odd, especially glasses.

By far the best fun is changing your hairstyle. You can choose jet black hair or you can be a blonde, brunette or redhead; each colour can also be lightened and darkened to different shades. The only drawback is you can't see what you would look like with a moustache and long

blonde hair — it's one or the other. But, you can print out the new you and take it to your hairdresser.

Also available are Additional Style Pack CDs (\$29.95 each) which cover specialty areas such as bridal veils, sunglasses and hat collections, as well as more recent hairstyles. Trial samples of these can be downloaded from the Web site for free. You can also change your eye colour with blue, green, violet or yellow-tinted contact lenses.

The make-up sections are disappointing, though. Eyebrows are extremely difficult to colour or pluck, and the foundation is impossible to apply without erasing half your nose and chin. Luckily there's an undo button. Although the program includes a US and Canadian Swatch Guide to accurately gauge make-up colours (they appear different onscreen), there's no Australian Swatch Guide.

As a realistic makeover tool, Virtual Makeover's powers are limited, but considering the popularity of this product among APC staff we had to give it four stars. We had many laughs transforming the numerous willing volunteers. The first three people to submit photos were male, so a Men's Style Pack wouldn't go astray either.

**Claire Waddell**



<b>Publisher</b>	Mindscape
<b>Distributor</b>	Scholastic New Media
<b>Phone</b>	(02) 4328 3555
<b>Price</b>	\$49.95
<b>Requires</b>	486, Windows 3.1/95, 16M RAM, 10M hard disk space, 2x CD-ROM drive; 68040, System 7.1, 16M RAM, 10M hard disk space, 2x CD-ROM drive
<b>Rating</b>	★★★★





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## Web Studio

Billed rather immodestly as "an innovation in the world of Web site design and construction", Sierra's Web Studio is a Lego-style approach to Web authoring.

Based around a simple drag-and-drop metaphor, the program is fairly basic but does have a wide variety of alternatives within its limits. The initial user screen is fussy with lots of toolbars, windows, scroll bars and icons. All the major events and additions to your Web site are added by dragging and dropping sample icons, text, images and effects from tabbed tool menus. The program also allows hotlinks — either selected from a range of pre-programmed Web addresses such as Fox Sports, Hotmail, and Weather, or ones you program in. Even more impressively, it allows sounds to be assigned to objects.

However, the overall feel of any Web site produced by Web Studio is likely to be uninspiring, given the frankly tacky nature of most of the clip art. The sound is also disappointing; if anyone described it as simply irritating, it would be a compliment.

In its defence, however, the manual does include a few useful pointers which encourage would-be designers to think about the end product, such as the site's target audience, how to build in appeal, and how to make them repeat addresses. There is also a very short section on HTML and a section on uploading the finished item to an ISP's server.

If you are looking to put pictures of the kids' first birthday with a brick wall background and a mosquito sound on the Web, this is the product for you.

**Jeremy Torr**

<b>Publisher</b>	Sierra
<b>Distributor</b>	Dataflow
<b>Phone</b>	(02) 9417 9700
<b>Price</b>	\$79.95
<b>Requires</b>	Pentium 150 or better, Windows 95, 32M RAM, 4x CD-ROM drive, XGA
<b>Rating</b>	★★



## Winnie the Pooh & Tigger Too

Pooh is back with a vengeance — his ample belly can be seen squished into every nook and cranny, from large toy stores to the local post office. If Pooh and Christopher Robin remain affectionate memories of your early years, and you can't think 'marmalade' without thinking 'The King's Breakfast', then Disney's Winnie the Pooh & Tigger Too Animated Storybook will blast you back in time. Oh, the kids will love it too (three to six is the designated age group).

Pooh explains the options at the opening screen. There are seven story screens from which to choose. A narrator reads the story and the words light up as he goes. When he completes the text, the characters interact with each other. When they have finished, you can click on different images to make them respond. Click on the door at Pooh and Piglet's house, for example, and Piglet will come out and shake out the doormat. Click again, and he'll pop out and sweep the yard.

There are also four activity areas: Gardening with Rabbit, Tic-Tac-Roo, Pooh's Icy Maze and Everyone Bounce; all can be played at three different ability levels. When moving backwards or forwards, you can avoid sitting through the characters' actions again, by pressing the Esc key.



The animation is extremely cute, as are the voices. As a learning tool, children can develop their observation skills, match up words with the way they sound, solve problems and even learn about keeping things neat and tidy — with a little help from Rabbit.

Don't be surprised if you find yourself urging the kids to pick Pooh when they ask you to play CDs with them. One question only: wherever is Eeyore?

**Lindsay Hayman**

<b>Publisher</b>	Disney Interactive
<b>Distributor</b>	Dataflow
<b>Phone</b>	(02) 9417 9600
<b>Price</b>	\$59.95
<b>Requires</b>	Pentium 90, Windows 95, 16M RAM, 20M hard disk space, 4x CD-ROM drive, soundcard, SVGA
<b>Rating</b>	★★★★

## Interactive News

● It's been a long time coming, but the battle between the new major home video standards, DVD and Divx (Digital Video Express), has ended with the DVD standard emerging victorious. The controversial Divx format, which made consumers pay each time a movie was watched (after the disc was rented from the video store), won't be released on our shores and operations have ceased in the US. Richard Sharp, chairperson and chief executive officer of Digital Video Express (and the company's major shareholder, Circuit City Stores), cited a lack of adequate support from studios and other retailers, though he insisted consumer enthusiasm is still high for Divx movies.

● Going under the general heading of mobile DVD, a host of car radio (and CD) manufacturers have been developing 'in-dash DVD video players'. Yep, they're DVD movies that you can watch on your car's dashboard. The advantage: the movies

will sound fantastic with a great car sound system. The disadvantage: obviously, the movies might prove to be a bit of a distraction to your driving. Of course, the manufacturers have thought of this and have included a locking feature that won't allow movies to be played while the car is in motion. Still, with the demise of drive-in movies this could be the next big thing for in-car entertainment... or not.

● The International Federation of the Phonographic Industry (IFPI) has released estimates of the cost of music piracy worldwide: about \$US10 billion or over 20% of total worldwide industry revenue. Due largely to the rise of MP3 files, the IFPI also noted the impact of the decrease of CD-R hardware — not only major operators in countries known as traditional piracy hotspots, but also increasingly through backyard users in developed countries.

**Gareth Jones**



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CX Business P11-433MHz Celeron, 64Mb RAM, 4.3Gb, 40xCDROM, 4Mb SVGA Card, 15" Teco Monitor, 10/100 LAN Card, Win98.	\$1400
CX Performance P11-450Mhz, 128Mb RAM, 13.1Gb HDD, 40xCDROM, 8Mb Matrox Millennium AGP Video Card, 17" Acer Monitor, Diamond Sonic S90 PCI Sound Card, Honeywell Keyboard, Microsoft Mouse, Win98.	\$2350
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Compaq Proliant 1600 P11-450Mhz, 64Mb RAM, No HDD, 24xCDROM, Lan Card.	\$5300
IBM Netfinity 3000 P11-450, 64Mb RAM, 9.1Gb HDD, 32xCDROM, 10/100 Lan Card.	\$5290
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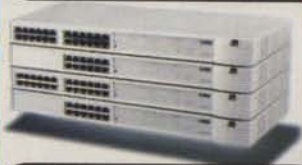
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If orangey purple creatures made of goo are your thing, give Gruntz a go. If not, there are plenty more to choose from.

# A load of Gruntz

## EverQuest

EverQuest is an online-only multiplayer adventure game of epic proportions, and it has already managed to set a new standard for online gaming. It certainly is impressive, but its enjoyment is marred by a few glaring problems.

The developer, Verant, has locked and reserved many keys, which means you have to put up with a strange control method. Also, unless you constantly hold down the right mouse button, it's impossible to use the popular mouse-look view that makes first-person games so enjoyable. This is equivalent to creating a PC which only works while you're holding in the power button.

The resolution flicks between your glorious high-resolution 800 by 600 or 1,024 by 768 full-screen view, to a 640 by 480 view whenever you trade, handle your inventory, and so on. Why Verant did this is a mystery, and we can only conclude the interface was added as an afterthought to the game.

However, this is the conundrum of EverQuest; despite the badly designed interface, the gameplay is fantastic. Verant has developed a remarkably well-balanced, brilliantly designed game world, complete with some very impressive graphics. Verant has succeeded where Origin failed; not only has Verant learned from Origin's mistakes with Ultima Online, it has improved the genre immensely.

Cooperative gameplay is encouraged and player killing is a non-issue — only those who choose and agree to duel can harm each other. As a result, the game is heavy on adventuring in parties and exploring the massive world of Norrath.

There are many races, classes and religions to choose from, and hundreds of spells and items to discover. As well as the usual humans, elves, dwarves, gnomes and the like, you can also play some of the shadier races such as trolls, ogres and dark elves. Similarly, you can play classes ranging from traditional paladins, rangers, wizards and clerics to shamans, necromancers and rogues.

The game world and its characters are so superbly designed that once you



indulge your inherent desire for adventure and join the multitude of other players jumping into the EverQuest world, you'll never want to return. This is as great an achievement in gameplay as the interface is a landmark in bad design.

The problems with the interface aside, EverQuest is destined to be a legendary game. If you like RPG and online games, or if you were disappointed by Ultima Online, then you must try EverQuest. Once you get used to the interface, you won't be disappointed.

### Ashton Mills

<b>Distributor</b>	Hilad
<b>Phone</b>	(02) 9700 9377
<b>Online</b>	<a href="http://www.station.sony.com/everquest/">http://www.station.sony.com/everquest/</a>
<b>Price</b>	\$89.95
<b>Requires</b>	Pentium 200, Windows 95, 32M RAM, 500M hard disk space, Internet connection
<b>Classification</b>	G
<b>Rating</b>	★★★★

## Sid Meier's Alpha Centauri

Activision may well have won the naming rights, but the true sequel to the classic Civilization series is not the recently published Civilization: Call to Power (reviewed in last month's APC), but Sid Meier's Alpha Centauri (SMAC) from Firaxis.

Not only does SMAC maintain the story-line from Civilization II (which ended with colonisers heading to the stars), but its developers, Sid Meier and Brian Reynolds, were also the wizards behind the original games.

Fans of Civilization I and II will quickly relate to SMAC. Some of the names may have changed (gold has become energy

and Wonders of the World have become Secret Projects), yet at its heart the game is unchanged. Diplomacy and warfare still form the basis of the game, as players build, explore, research and conquer.

Perhaps the biggest change is the implementation of factional AI. The game starts by choosing from one of the seven philosophical factions into which the colonisers splintered during their journey from Earth. Each faction provides certain bonuses to support the chosen style of play.

The Spartans, for example, are survivalists adept at military research, whereas the greenies of the Gaian League are best at unlocking the secrets of the planet's bizarre ecology. Not only does this approach introduce a role-playing element to the game, but it permits an almost unlimited variety of political and military strategies.

Other worthy improvements include a smooth multiplayer implementation (including voice communication), a design workshop for building customised



units, and exhaustive in-game help. Also included is an excellent 200-page manual which helps enormously in understanding this full and complex turn-based strategy game.

The futuristic setting of SMAC means that at times the technologies seem obscure. Also the graphics, while functional, are nothing to write home about. But this is carping. Where SMAC shines is where it counts; in its richness and its addictiveness.

### Jon Gill

<b>Distributor</b>	Electronic Arts
<b>Phone</b>	(02) 9955 7744



## Games News

● Fond of knee-jerk reactions, the US Government has been debating how to curb youth violence, à la the recent Columbine shootings. Not surprisingly, a bill was introduced to the US Congress to ban the sale of violent computer games to anyone under the age of 17, with penalties of up to five years' imprisonment. The bill originally included laws to tighten controls on youths' access to guns, but was then separated into two bills, and the violent media bill was voted out. So, for now, sanity prevails, and computer games haven't been scapegoated. Well, not quite yet, anyway.

● You thought Kingpin was offensive? Well, if newly formed development house Big Afro Productions (BAP) isn't exaggerating, you ain't seen nothing yet! BAP has two games in production. The first, J.J. Longfellow: A '70s Adventure, is a silly retro-style '70s adventure with lashings of muscle cars, body shirts and wild'n'wacky flares. However, Rival Gangs, which BAP describes as Gangsters meets Kingpin, has captured all the initial attention. In fact, BAP claims it will be

"the most controversial game ever". Let's just hope there's substance to the gameplay, as well as controversial material.

● Fox Interactive's first decent game, Aliens versus Predator, has been selling like hotcakes recently, and with good reason too — it's a great game. In a peculiar move, however, its developers seem to have thought it would be fun to only allow players to save at the start of each level. This is a terrible regression into console territory, and Fox Interactive has been receiving plenty of flak from fans about it. All is well that ends well, though, because a patch should be available by the time you read this to enable saving whenever and wherever you want. Lovely!

● Granddaddy of the industry and owner of Firaxis Entertainment, Sid Meier, has begun work on Civilization III. Expect it in a year or two — but in the interim, Alpha Centauri owners can download a Meier-created scenario called Fight for the Boreholes from <http://www.alphacentauri.com/>. **Gamespy**

**Online** <http://www.alphacentauri.com/>  
**Price** \$89.95  
**Requires** Pentium 133, Windows 95/98, 16M RAM, 4x CD-ROM drive, DirectX 6  
**Classification** G  
**Rating** ★★★★★

## Gruntz

Generally, if you see a game that substitutes the letter Z for S in its title in an effort to be wacky, you should run a mile. If, however, this rule forced you to run screaming from Gruntz, that would be a pity. It's a fine game, although, if you've got a lot of work to do, maybe you should run screaming as it is very addictive.

You control an army of Gruntz, which are cute little orange/purple creatures made out of goo. It's your job to rescue them, à la Lemmings, but from a top-down, RTS-style view. The fierce ingenuity of its puzzles and its twisted, often ridiculous sense of humour, save Gruntz from being a mere Lemmings clone. Click on your Gruntz, and they talk. Deliver a warystone to the King and he'll burst into

song — badly, but worth listening to.

Gruntz has cute cartoon graphics that are unlikely to tax your system too much, which is a blessing in this age of soulless 3D games requiring multiple graphics cards and ice-cooled processors. Make sure you play with the sound up, though. There's nothing like the first time your warring Gruntz go into battle with a cry of "let's open a can of gool". Multiplayer support is offered as an RTS game, but this really isn't Gruntz's strong point. The puzzles are what make it fun. And dangerous. This game can eat up serious amounts of your time. I'm sure I had some work I was meant to be doing...

**Alex Kidman**



**Distributor** GT Interactive  
**Phone** (02) 9902 3000  
**Online** <http://www.gruntzgoo.com/>  
**Price** \$49.95  
**Requires** Pentium 133, Windows 95, 32M RAM, 4x CD-ROM drive  
**Classification** G  
**Rating** ★★★★★

## Star Wars: X-Wing Alliance

OK, so by the time you read this, *Phantom Menace* mania will have gripped the nation, with rioting in the streets and a general outbreak of anarchy. Or perhaps not. In the meantime, hopefully someone will still be playing X-Wing Alliance, the latest in LucasArt's long-running X-Wing/TIE Fighter games. The general game mechanics really haven't changed that much since TIE Fighter. So what does X-Wing Alliance offer?

Well, for a start, it has a coherent plot. Play through the game in single-player mode, and you'll become Ace Azzameen, the youngest son of a trading family on the periphery of the Empire/Rebel war. Being a Star Wars game, of course, things don't remain like that for long, and you soon find yourself in the thick of combat, spying and treachery.

LucasArts has obviously realised that you can't simply string out sequels to games with minor graphical polishes,



and this time around has concentrated on the game's characters, from argumentative members of your own family to the slimy Viraxo clan, and your own personal droid, Emkay.

Graphically, X-Wing Alliance isn't that much more advanced than X-Wing vs TIE Fighter, or even last year's X-Wing Collector series rehash. Thankfully, the gameplay is what shines through. Controls are pretty much what they've always been for this series — a little tough to get the hang of at first, but logical and easy to follow once you've got the trick of it.



As with X-Wing vs TIE Fighter, multiplayer play is supported. Just be prepared to waste an awful lot of time shooting your friends down. If you've had your fill of Star Wars space sims, then don't bother. If, however, you're hopelessly addicted to the force, jump right in.

**Alex Kidman**

<b>Distributor</b>	Metro Games
<b>Phone</b>	(03) 9329 2999
<b>Online</b>	<a href="http://www.lucasarts.com/">http://www.lucasarts.com/</a>
<b>Price</b>	\$79.95
<b>Requires</b>	Pentium 90, Windows 95, 16M RAM, 2x CD-ROM drive
<b>Classification</b>	G
<b>Rating</b>	★★★★

## Cricket World Cup 1999

The ship date slipped from March, but Electronic Arts managed to deliver its latest sports game just in time for the real Cricket World Cup.

It's a good idea to start with some practice in the nets to get a feel for the batting and bowling controls. The basics aren't difficult, but timing is everything. As with most sports games, a gamepad is useful.

When you're ready to take to the field, start with a one-day match and slide the



difficulty level to its minimum, otherwise you may find yourself overwhelmed by superhuman fielders. The computer takes care of all the fielding chores, so players can concentrate on batting and bowling.

Playing against the computer or a human opponent, you can choose how much of the work you do: batting or bowling can be transferred to the computer (following your strategic settings) either for a single ball, the rest of the innings, or until certain conditions (for example, a particular score) are met. You can also act as captain, setting the field and picking the bowlers. These variations add interest and extend the life of the game.

The commentary by Richie Benaud and David Gower is generally entertaining though sometimes repetitious or even inaccurate. The sound effects are also enjoyable, including the rhythmic handclap as fast bowlers run in.

The amazingly broad-shouldered players are otherwise nicely represented using motion-capture techniques and the arenas look quite realistic. A 3D card will make a big difference to your overall enjoyment. The game prefers DirectX 6 to 6.1 (some black dots appear with the latter), which is a problem if you've already upgraded, as there's no easy way to go back.

The packaging and the EA Sports Web site promise downloadable team and player stats but they weren't available at the time of writing. We like the idea of playing simulated World Cup games including real weather conditions and players' form, but it remains to be seen if EA will actually deliver.

All told, Cricket World Cup is an entertaining game that can be played at quite easy or very challenging levels, and it's fun to play alone or with a live opponent.

**Stephen Withers and Daniel Withers**

<b>Distributor</b>	EA Sports
<b>Phone</b>	(02) 9955 7744
<b>Online</b>	<a href="http://www.easports.com.au/">http://www.easports.com.au/</a>
<b>Price</b>	\$49.95
<b>Requires</b>	Pentium 166, 32M RAM, 4x CD-ROM drive, 140M hard disk space, 4M PCI video card, DirectX 6. With 3D graphics accelerator: Pentium 200, 8x CD-ROM drive
<b>Classification</b>	G
<b>Rating</b>	★★★☆☆

## Jane's Fleet Command

Jane's Fleet Command (JFC) is a naval simulation game in the same vein as that 'old faithful' series of modern sea warfare, Harpoon. JFC is essentially Harpoon on steroids. It features quality, real time gameplay injected with dynamic 3D effects. Like Harpoon, the action centres around global flashpoints based on past and future conflicts.

As the Fleet Commander, you must issue orders to your battle group in an attempt to neutralise the enemy forces and quash the conflict. To develop a realistic naval strategy game, Jane has formed a partnership with Sonalysts —

the people who develop training software for the US Navy.

And it's not just the good ol' US of A guys versus the bad ol' Russian commies. You can play as one of the world's 16 leading navies, all with the most advanced arsenal of guided missile cruisers, nuclear submarines, aircraft and weapons at your disposal. There are many single missions from which to choose, as well as a full campaign and multiplayer option. The missions may see you engaged in a small patrol boat encounter or leading an entire carrier battle group.

To be able to play JFC comfortably, you will need to quickly grasp control of the interface. Luckily, four tutorials are included to guide you on how to command your platforms and deploy weapons. There are a few quirky issues but these won't hinder gameplay to any real extent. The main interface is based around four windows. The 2D map is the main control centre where orders are issued and the mission can be closely monitored. The regional map and data



display relays all the latest information, while the 3D window lets you witness all the action graphically.

The seas are full of unidentified contacts in JFC. Detect and identify them, determine their status, and reach your mission goals, all while trying to protect your own fleet. It's not as easy as it sounds. That's probably why General Nimitz had a head full of grey hair.

**Andrew Broadhead**

<b>Distributor</b>	Electronic Arts
<b>Phone</b>	(02) 9955 7744
<b>Online</b>	<a href="http://www.janes.ea.com/">http://www.janes.ea.com/</a>
<b>Price</b>	\$89.95
<b>Requires</b>	Pentium 200, Windows 95/98, 32M RAM, 8x CD-ROM drive, 3D graphics accelerator, DirectX 6
<b>Classification</b>	G
<b>Rating</b>	★★★☆☆



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# Cut and paste culture

## cutnpaste

The zine review section of *Voiceworks*, a national youth literature magazine, is aptly titled 'Reviewing zines is like catching butterflies with a sledgehammer'. It's not easy to review a zine — an amateur publication probably put together by a teenager in their bedroom — as the normal rules of reviewing don't apply. The design and content of zines are unpredictable and their intended audiences are small and unknowable. It may be better to present a zine as it is and let the readers decide if they like it.

This is the approach taken by Jane Curtis, the coordinator of cutnpaste, an online and touring physical exhibition of Australian zines, ezines and comics. At the physical exhibition, the zines are hung from metal stands on dog chains. Couches and stools are provided so visitors can sit and read the zines.

The Web site has a list of "participating publications" and lets the zines speak for themselves. The zines' descriptions are not written by Curtis, but are taken from questionnaires answered by the zinemakers. Gusset, for instance, is described as "butter knife technology + pink + girlie + kinda humorous + personal + ezine + gusset".

Each zine also has its own page containing images, contact details and a more detailed description of the zine's content. These pages can be accessed from the alphabetical list or can be browsed in random order. However, there is no search function or listing of the zines by subject. While this lack of navigational aids would count against a site in a normal Web File, cutnpaste is making a point about the chaotic world of zines. Zines can't always

be reduced to a simple list of subjects, and some zines (for instance, those by Another Bodgy Production) change their title with each issue.

The cutnpaste site has a number of resources to encourage visitors to make their own zines or seek out those of others. Paper zines can be purchased using the zines' contact details listed on the site, by going to comic and record shops or trading with other zinemakers through informal networks. The site also hosts two essays about zines which were presented at the National Young Writers Festival by postgraduate student Kirsty Leishman. Leishman writes that zines create a community of writers which is in a "constant process of exploring ways of being in the world".

The resources page links to external sites about censorship, copyright, distributors, directories and a high-traffic electronic mailing list for Australian zinemakers. The site features some unusual graphics and icons set against a pumpkin-coloured background, many of which have been taken from the exhibited zines. If you're interested in self-publishing, online or off, cutnpaste is a rewarding place to visit.

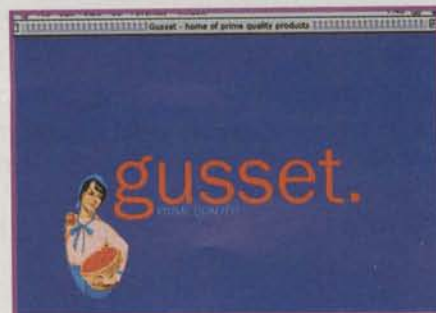
Glenn Phillips

Online <http://cutnpaste.va.com.au/>  
Rating ★★★★★

## Gusset

Rather than an alias for an obscure fetish, this site's name is a satirical swipe at the restrictive social sensibilities symbolised by the gusset and the era of social oppression that produced it and its cousin, the corset. With such commitment to this social debate, it shouldn't be surprising to find that much of Gusset's content is influenced by feminism.

Much but by no means all — Gusset's primary affiliation is, if there is such a thing, with the alternative culture and aimed at a youth audience actively committed to questioning the social order. Gusset contains book reviews, interviews with musicians and counter-cultural figures, the odd fist-in-the-air article — all species common to the street press.



Most of the writing is fairly pedestrian and Gusset Girl (the ezine's editor) seems reluctant to use the Web's freedom to experiment. Gusset Girl's account of gatecrashing the NineMSN launch (lest we be accused of bias, APC is also owned by PBL) is typical of the site's content. It's been written with the kind of righteous fervour that assumes that launching fashionable attitudes loudly, angrily and repeatedly from the hip qualifies as a good read.

Unfortunately, this collection of cappuccino-flavoured interviews and searing insights into the life of itinerant office workers will hold your attention for all of about two minutes. The best intentions in the world could never convince anyone to get online and battle with an overloaded free Web server to find out what book Juliana Hatfield is reading. Nor would Henry Rollins' latest unapologetic diatribe about feminists.

Regardless of the amount of faith placed in the quality of the content, ezines really need to capitalise on the graphical advantages they have over print media. With the exception of Gusset's single locket-sized graphic, the design consists of black text set against a shade of mauve that Dame Edna Everage might describe as 'liver'. This gives the entire site a lazy, amateurish feel that makes it about as enticing as a holiday in Kosovo.

It's almost fortunate then that you don't need to return that often. Though the site states it was updated recently, the only article that appears to have any currency is a critique of two recent additions to feminist literature. The rest of the site seems to date back to sometime around the end of the LOUD festival, which was in January 1998 (there are few datelines).





Gusset is a classic case of a nice idea poorly executed.

Andrew Colley

**Online** <http://members.tripod.com/~gussetgirl/>

**Rating** ★☆

## Object Not Found

Have you ever found photographs in your house that were left by a previous tenant? Ever wondered about the people and events they have captured? Object Not Found is a collection of 'found' photos, postcards and letters, compiled by Damien Frost, that tell a fascinating story. The ezine may look familiar to those who have visited the LOUD festival Web site, as Frost also contributed to that site's design.

The ezine includes two postcard collections that Frost found in a bookshop in Cooks Hill and a café in Newcastle. The older collection of postcards from Cooks Hill is an assortment of images of early 20th century Australia, which allows a voyeuristic glimpse into a complex network of friends and family. As you click through the cards, you realise the same names repeatedly appear and a story begins to emerge.

Many of the cards are addressed to Ethel and chronicle Bell and Arthur's travels around the east coast of Australia. They appear in no particular chronological order on the site, as only a few are dated. One postcard from Leura Falls in the Blue Mountains is addressed to "Mother" and signed "Bell, Ethel and Artie". Another postcard with a birthday rhyme and floral graphic on the front, sent by Artie to Bell, says "... I hope your next birthday will find you answering to the name of Mrs D. and Mistress of your own home". There are other postcards from Arthur to Bell about his stops on a trip from Newcastle to Hobart. It seems that Bell (aka Miss Bella Mood) and Arthur, (aka Artie, Arthur Draper or APD) are engaged. However, a later postcard of the Zigzag Railway near Lithgow, sent to

## Surfbaud: Zine tech

The underground culture of zines first came to attention in Australia with the obscenity trials of Oz and *Thorunka* in the early 1970s. Since then, the photocopier, desktop publishing and the Internet have lead to the proliferation of these ephemeral, self-published magazines. Following the LOUD Media Festival of Youth Culture and the Arts in 1998, which published *The New Pollution* zine anthology, there has been a renaissance of interest in zines. Many of the zines collected in *The New Pollution* are currently touring the eastern states of Australia in the **cutnpaste** zine exhibition.

It is very difficult to describe zines in terms other than do-it-yourself and experimental. Zines can be handwritten words and/or images on paper, the Web, video, T-shirts or stickers. While the first zines were about science fiction, sports teams and pop stars, there are now zines about everything. They can't easily be divided into genres, but like *Geekgirl*, often combine personal observations, autobiography, satire and politics. Some zines explore discarded or overlooked aspects of everyday life, like Object Not Found, or explore conspiracy theories and strange events, like *Bizarism*. Zines value personal expression over commercial potential.

The Internet has become popular as a way of publishing zines in the past few years, partly because of the reduced production and distribution costs, but also because of the possibilities it opens up. Some paper zines which have migrated to the Internet, again, like *Geekgirl*, are now only published online. The first ezines were simple ASCII text

files distributed on BBSes, but ezines are now published in HTML, Java, Shockwave and PDF. Many zines are published on free Web space, such as GeoCities, Tripod and university servers. The Internet has also changed zines — ezines can be updated whenever their editors have new content, and not just when the editors have enough content (and enough money) to publish another issue.

If you are looking for an Australian-made zine, the Web sites of *The New Pollution* and cutnpaste are the best places to start. Both sites include background on zine culture and information about making and distributing your own zines, although cutnpaste is more up to date. *Factsheet Five*, a long-running US zine about zines, has its own Web site with zine reviews, FAQs and event listings. **John Labovitz's e-zine-list** is an attempt at an international directory of zines, sorted by title and keyword.

While there will always be handmade zines (a friend once told Surfbaud a scribbled-on beer coaster can be a zine), other zinesters will exploit new publishing technologies. Whenever a new medium emerges, there's no doubt somebody will be using it to do their own thing.

Glenn Phillips

### The New Pollution

<http://evolver.loud.org.au/nupoo/cutnpaste>

<http://cutnpaste.va.com.au/>

### Factsheet Five

<http://www.factsheet5.com/>

### John Labovitz's e-zine-list

<http://www.meer.net/~johnl/e-zine-list/>

Ethel from Bell (while on her honeymoon), reads "I would be very lonely if I had not my knitting here with me. I have done one stocking."

Something more contemporary is a collection of letters found by Frost in a studio above Newcastle's Lucky Country Hotel. These letters also feature a small circle of characters and are accompanied by Frost's own witty comments. One note appears to be a shopping list, but, as Frost writes, has "cryptic instructions similar to those given to protagonists in suspense/action films". The note reads: "postage, wine, mineral water, apple

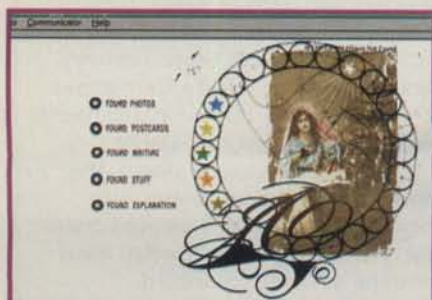
juice, ice posters; a) time payment 20% deposit red stick; b) wait til end of show 10% discount; c) make another one very similar later".

Although the ezine has recently changed address and been updated, two headings — 'Found Stuff' and 'Found Explanation' — do not yet have any content attached. Overall, Object Not Found is a quirky exploration of discarded communication.

Glenn Phillips

**Online** <http://www.renewal.org.au/object/>

**Rating** ★★★☆





# Chip Chat

Anyone who has more computer industry knowledge than, say, John Howard, would be aware of the dominance of three-letter acronyms in IT. From longstanding favourites such as random access memory (RAM) through to more recent coinages such as customer relationship management (CRM), three letter acronyms (TLAs) have become a standard means of communication.

In theory, TLAs make it easier to race lightly across the surface of a technical topic without becoming bogged down in the mudflats of precision, or getting stuck in a long and unwieldy sentence like this one. However, within the murky waters of TLAs there lurks a terrible secret: at the end of the day, all TLAs boil down to meaning one of two things.

The first can be expressed as 'maximising value for greater enterprise benefits and throughput'. A more colloquial definition would be 'let's screw them for all they're worth', or Category 1.

The second is officially 'ensuring high levels of scalability and output in a wide range of computing environments'. Again, because Chip Chat is an informal column, we've simplified this to 'hopefully the bastard will work now', or Category 2, depending on how sore our typing fingers are at the time.

CRM falls into Category 1. CRM software is designed to closely track a company's relationship with a customer, ensuring they receive consistent and informed service and are placed in a frame of mind conducive to further high-value transactions. Or in short: let's screw them for all they're worth.

The Category 1 definition also applies on a second level. CRM as a category is rapidly being embraced by software companies of all sizes, from high-level database management systems through to spreadsheets with the letters 'CRM' at the top. As these varied sources pitch their products to unwary businesses, just one thought is going through their heads: let's screw them for all they're worth.

Y2K (really a two-letter, one-number acronym, or TLONA) is a classic example of Category 2. As the not-to-be-missed deadline date looms ever closer, there is just one thought going through

everyone's mind: hopefully the bastard will work now.

Of course, there can be overlap. Many of the companies pitching Y2K fix-it kits and services are also clearly thinking 'let's screw them for all they're worth'. But being in the IT industry means never having to say sorry for using multidimensional arrays, until you get confused.

All TLAs can be fairly neatly categorised in this way. People adding extra RAM to their systems are undoubtedly thinking 'hopefully the bastard will work now'. Companies using enterprise resource planning (ERP) software are still working towards the primary business goal of 'let's screw them for all they're worth'. Anyone trying to achieve ISO compliance is undeniably going to use the word 'bastard' a lot. And so on.

The ultimate goal is to take products which aren't currently represented by a TLA, reduce them to one and then place them in the correct category. However, this can be fraught with difficulty. For

And you thought four-letter words were rude?  
Try some three-way action.



instance, Windows 98 could be conveniently abbreviated to W98 (technically a OLTNA). But is the ultimate message of W98 'let's screw them for all they're worth' or 'hopefully the bastard will work now'? Suggestions are welcome to chipchat@acp.com.au.

## Contest: Technology gag of the month

This month, the Technology Gag team has a mission: short, sharp and possibly stupid. So we've decided to reward a number of readers.

The first winning observation comes from Martin Wurzinger, who's waxing philosophical: If you type "\*\*\*\*\*" for a search query on the Web, do you get the answer to everything? No, but Martin gets an @Home Network T-shirt, a

copy of DataViz Conversions Plus, and a pre-paid Net access kit of dubious value.

We've also decided to reward Peter Baayens, who sent us the pictured real world example of an AOL password that's perhaps a bit too accurate for its own good. Peter gets a Calidad hat, a BSAA mouse mat — which has a real mousetrap attached — and a copy of IMSI FloorPlan3D Design Suite.

Last and quite possibly least is this handy one-liner from Anna Price: KY2K jelly: for when you want four digits to fit where two went before.

Tasteful, hey? Anna gets an Epson T-shirt, a Tell Me More German software package, a horseshoe and a Sun notepad holder in extremely poor condition. (We've been trying to offload it for a while.)

Send your technology jokes — the shorter and funnier the better — to chipchat@acp.com.au. If we publish your joke, you'll win specially selected items from the APC prize cupboard.

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